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A BOTANIST IN SOUTHERN AFRICA

by

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WITH NUMEROUS PHOTOGRAPHS, DRAWINGS
AND MAPS.

FOREWORD BY

FIELD-MARSHAL THE RT. HON. J. C. SMUTS

P.C., LL.D., F.R.S.

Prime Minister of the Union of South Africa.

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TO

I. B. POLE EVANS

C.M.G., LL.D., D.Sc., M.A.

former Chief of the Division of Plant Industry
and Director of the Botanical Survey of the Union of
South Africa

IN GRATEFUL ACKNOWLEDGMENT OF
MUCH HELP DURING MY TRAVELS

FOREWORD

TO the botanical world Dr. John Hutchinson of Kew is well known, but this book is certain to be read and enjoyed by many outside the ranks of botanists, and for them a few words of introduction may be useful. To me personally the comradeship in the field with Dr. Hutchinson on several botanical expeditions recalls many happy memories, and this adds to the pleasure of writing some lines to introduce the present work, which deals to some extent with the results of those expeditions. To me the amateur, as to him the specialist, Botany is a true link and a great bond between us.

I have always been a lover of plants. As a farmer's son in the old Cape Colony days I grew up close to Nature and all her intimate ways, and when later I studied botany at college I used to accompany Professor Marloth, a great figure in South African botany, on his botanical expeditions. Botany thus was a natural hobby to me, and my holidays were usually spent in long rambles over the veld and on the mountains of what was, and still remains, one of the floral paradises of the world. The bond with Nature and plants was not so much scientific as personal, and deepened into a spiritual influence of an abiding character. Thus in the busy crowded years of later life I took my relaxation and spent my occasional holidays in botanical rambles, away from the human pressure which is of all the most exciting and oppressive. For to the busy mind there is no release, no easing off comparable with that of just wandering away and tramping over the veld, absorbed in the wild life of plant and beast. It is the true wholesome escape from life's oppressive exigence.

In my botanical reading I had learned to know of Hutchinson as the Kew specialist who had determined very large numbers of South African and tropical African plants, and later as the author of *Families of Flowering Plants*, a handbook which I have come to use as the best taxonomic arrangement of flowering plants known to me.

The pattern of plant life as a whole has always intrigued me. Now, of flowering plants there are somewhat less than 350 families, somewhat more than 11,000 genera, and over 150,000 species known at present. Unless some systematic arrangement of this immense mass could be effected, botany as a science, or even as a practical pursuit, would be hopeless. The earliest successful attempt at classification was made by Linnaeus in his artificial system, and since his time systematic botany has advanced by numerous steps, until we have now reached the two rival systems of Bentham and Hooker on the English side, and Engler and Prantl on the German side, both dating from the last century, and both on more natural lines of classification than those

followed by Linnaeus. Hutchinson's system mediates between these two and shows an advance mainly in two directions.

In the first place, the advance of evolutionary ideas has led him to pay more attention to phylogenetic development in plant life, so that with him the pattern of arrangement follows more the lines of the family tree and of natural descent and relatedness rather than outward resemblances of form. Phylogeny is, of course, a very recent scientific study, and much of it is still uncertain and obscure, so that success on phylogenetic lines can only be very approximate at present, and we must look upon taxonomy as a progressive study likely to lead to ever greater success as time goes on. But it is in the true line of evolutionary doctrine, and therefore likely to disclose the more fundamental relations on which systematics should be based. Hutchinson's demarcation of families and their grouping into orders appears to me therefore a real advance on both the older, somewhat out-of-date systems.

His second advance makes the flowering families smaller, more natural, homogeneous, and compact, and eliminates as much as possible the arbitrary and artificial grouping and basing of families on mere accidental characters. These two improvements make Hutchinson's system to my mind not only more in accord with the true scientific trend, but also more practical and useful to the working botanist. His earlier volume on the Dicotyledons has since been followed by a second volume on the Monocotyledons which marks an even greater departure from the two orthodox systems. I use him habitually, and find him a helpful companion in my botanical rambles.

So far I had known Hutchinson only from his book and his writings in the *Kew Bulletin* and other scientific journals. He had been receiving the best possible scientific training in the great school of Kew and under masters such as Hooker, Prain, Thiselton Dyer and other great experts at Kew. But Kew and its Museums and Herbaria are not enough. Botany is a science of life, and cannot be learned fully from the dead, from dried specimens buried in paper covers. All the great botanists have been naturalists, field naturalists, studying Nature from life, wanderers and seekers for the precious secrets, which only intimate contact with the living can disclose. Analysis and dissections of the dead are useful, but the truth is revealed only to the eye of the holist, discerning the innermost pattern of the living whole. Hutchinson had still to complete his studies and to graduate in the great university of Travel. He had studied Africa dead in the Herbarium. He had still to see it living in the sun, on the mountains and the plains, in heat and drought, in rain and swamp, in the shadows and the insolation of this so-called Dark Continent. He had to see it to believe.

His first chance came in 1928. The recently established Empire Marketing Board had allowed certain scientific establishments in the British Commonwealth grants of money in aid of research. Sir Arthur

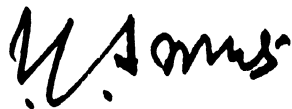
Hill, then the Director of the Royal Botanic Gardens at Kew, made wise use of this opportunity to send some of the keen botanists on his staff into the fields connected with their sphere of work in the Herbarium. The first to be sent on a mission of this kind was Hutchinson. He was then in the middle of the preparation of the *Flora of West Tropical Africa* in collaboration with Dr. J. M. Dalziel. The completion of that comprehensive work naturally delayed the appearance of the results of his visit to South Africa. Like other mortals, he had not enough spare time at his disposal to carry out two large tasks simultaneously and do justice to both. Even so, the bulk of the present book has been written and illustrated at odd times ever since he completed his first African visit in April 1929.

His second visit was made in 1930, when I invited him to accompany me on a botanical jaunt to the Rhodesias and Tanganyika. Dr. I. B. Pole Evans, the Chief of the Plant Division in South Africa, also accompanied the expedition. Some members of my family and my dear friends the Gilletts from Oxford were also of the party. What a jolly botanical band we were! How we roamed at will through the floral treasures of Southern Africa! What busy days of collecting, swimming the rivers, climbing the mountains; nights by the veld fire, with the native dances to the beating of Africa drums; sleeping under the stars, modest feeding away from hotels; camping by the ruins of Zimbabwe, by the smoke-mist of the Victoria Falls, by the shores of Lake Tanganyika and the banks of the Luanzua torrent rushing headlong into it. What joy to find plants never found before, to search for *Monotes* through the forest, only to find that we had been sleeping all night under a *Monotes* tree! What fun to present Hutchinson with a live plant which he could not recognise, only to be told that he had determined it dead at Kew! And the sudden squall on Lake Tanganyika in which our frail launch might so easily have disappeared with its precious load of botanists! It was a thrilling time, and some of us were invited into the mysteries of Africa in an experience which will surely never be forgotten. Nor was it all a joy-ride. Physically it was as tough a job as the best of us could stand. And there came a stage when I much fear the pace was too hot for the best botanist of us all, and he had quietly to sidestep the cavalcade and retire to the Belgian Congo, there to pursue his collecting under less hectic conditions. The rest of us hurried back south to join in the less pleasant, still more hectic pursuit of the political game. For the Great Depression was on, and the crisis of the Gold Standard was not far off.

Much has happened since. Hutchinson has become Keeper of the Museums of Botany at Kew, and has made another expedition, this time to the top of the Cameroons Mountain in West Africa, and he has completed and published his new volume II on the Monocotyledons, already referred to.

The appearance of the present work has been delayed, partly owing to technical difficulties, partly to causes which had overshadowed our human destiny. Think of the last five years and their effect on the publishing business ! At last the book appears, and much thanks are due to P. R. Gawthorn, its publisher. Not for the first time his enterprise and munificence have been put at the service of science. May he have his reward in the success of this notable contribution to botanical science.

As for Hutchinson, he has now graduated as a field naturalist and has joined the notable band of African botanists and collectors which includes such distinguished figures as Thunberg, the father of African botany, Masson, Bowie, Burchell, Ecklon and Zeyher, Drège, Bolus, and Schlechter in South Africa, Barter and Mann in West Africa, and a host of others in all parts of Africa. Although he has collected much and widely, the main object of his African visits has been to study plants from life in the field, and not dead and buried in folders. With his knowledge and experience and his capacity for work, we may yet look forward confidently to many more fruitful contributions from him at Kew. But " will they ever come again, the long long dances " in those magic fields of African botany ?

A handwritten signature in black ink, appearing to read 'H. A. Jones'.

AUTHOR'S PREFACE

AT this distant date "Better late than never" is the best maxim I can think of regarding this book. Even by the beginning of 1939, when it was ready for publication, it was rather overdue, though its preparation had taken several years of as much of my leisure time as I could give to it. Its progress depended largely on the determinations of my specimens, particularly of my first collection made in South Africa in 1928-9, which consists of about 3200 numbers and represents nearly as many species. Rarely did I gather the same species twice. And three sets of as many as possible were collected; the first for Kew, and a set each for the Bolus Herbarium and the National Herbarium at Pretoria.

South African plants are usually much more difficult and critical to name than those from Tropical Africa. Genera such as *Polygala*, *Agathosma*, *Indigofera*, *Erica*, *Helichrysum* and *Senecio*, *Sutera*, and especially the family SELAGINACEAE, are particularly troublesome and sometimes even exasperating. Apetalous genera, such as *Thesium* and *Euphorbia*, are just as bad, and *Gladriolus* and *Anthericum*, among the Monocotyledons, are now very nearly hopeless to name from ordinary herbarium specimens.

The time I have been able to spare for this work has necessarily been very spasmodic, because of the task of writing the *Flora of West Tropical Africa*, the last part of which appeared in 1936. And during those years, among other things, as pointed out in the foreword, a special study of the Monocotyledons of the world was carried out, the results of which appeared in the second volume of my *Families of Flowering Plants*.

THE writing of the book, however, has been a congenial task during many a winter's evening, bringing back happy days spent with new and old friends in that land of sunshine before the war. To these I tender an apology for its tardy appearance, particularly to Dr. I. B. Pole Evans, C.M.G., whose unfailing interest and help have encouraged me to complete it. To him also I am very greatly indebted for the numerous photographs which he has so generously allowed me to use. It gives me great pleasure, therefore, to inscribe the book to one who has done so much for South African botany.

I have arranged the matter in five parts. Part I deals with the outward voyage, with a few notes on the various oceanic islands *en route*, the Wegener hypothesis, a general sketch of the flora of Africa as a whole, and my excursions with Cape Town as a centre, including a trip to Little Namaqualand and Bushmanland.

Part II tells the story of my car journey from Cape Town via the Knysna Forest, Port Elizabeth, and the native States of the Eastern Province to Durban and thence to Pretoria.

Part III describes my journey from Pretoria to the Limpopo and Zoutpansberg with Field-Marshal Smuts and other friends, and various excursions from Pretoria as a base, twice with Dr. I. B. Pole Evans, at that time the Chief of the Division of Plant Industry. In this

section I also describe my return journey to Cape Town via Kimberley, the Kaap Plateau, and Graaff Reinet, the whole having taken about eight months.

Part IV contains an account of a second visit to Southern Africa, this time as the guest of Field-Marshal Smuts on a special expedition to Lake Tanganyika, via Zimbabwe, and the Victoria Falls. I also took the opportunity of visiting the Katanga district of the Belgian Congo, and the Matoppos, with a further visit to the Zoutpansberg on my return, besides an excursion to the top of the Mont aux Sources, in the National Park, Natal.

THE last part contains chapters on (1) the Floral Regions of South Africa, (2) an account of botanical literature with special reference to taxonomy, (3) some notes on the history of botanical exploration, including a list of Burchell's localities, (4) a new phylogenetic arrangement of South African families of flowering plants, (5) list of Zoutpansberg plants, and (6) a detailed list of the localities where I collected.

The accounts of the plants collected in Parts I-IV may prove useful to botanists who happen to visit any of the localities at about the same time of year, and the last part should be of interest to students.

Much still remains to be done in regard to the classification of South African plants, their nomenclature, and their geographical distribution, the flora being one of the most interesting in the world in that respect. Particularly does the science of botany in South Africa need popularising to bring recruits to the fold. As pointed out by the late Sir Arnold Theiler in his presidential address to the South African Biological Society in 1928, South Africa needs men of the type of Gilbert White, Richard Jefferies, and W. H. Hudson, etc., to preach the gospel of the love of Nature, and make converts to the cause throughout the length and breadth of the country.

IN the course of my wanderings I met numerous people and made many friends who contributed largely to the success of my tour in Southern Africa. To all of them I am very deeply grateful, particularly Field-Marshal and Mrs. Smuts and members of their family, Mr. and Mrs. Arthur Gillett of Oxford, and their son, Mr. Jan Gillett, to Dr. I. B. Pole Evans, C.M.G., Dr. E. P. Phillips, and Mr. (now Dr.) R. A. Dyer, of the Botanical Survey, Mrs. (now Dr.) Bolus, Professor Compton, Mr. Pillans, Mr. James Logan, Dr. Fourcade, Mr. F. R. Long, Miss Verdoorn, and Miss Forbes, and many others whose names appear in the book.

I am also greatly indebted to my former chief, the late Sir Arthur William Hill, K.C.M.G., who made it possible through the Empire Marketing Board for me to visit the country and follow in the footsteps of those travellers and botanists who have contributed so much to our knowledge; in addition, he very kindly read through the MS. and made many helpful suggestions.

Finally I cannot adequately express my gratitude to Mr. P. R. Gawthorn for his great public-spiritedness in publishing the book in such difficult times and entirely at his own expense.

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Field-Marshal the Right Hon. J. C. Smuts, P.C., LL.D.,
F.R.S. (by permission of the artist, Professor Arthur
Pan and the University of Cambridge) *Frontispiece*

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PART I

Chapter I

THE OUTWARD VOYAGE

EVEN so long ago as the year 1795, Professor Carl Thunberg, the celebrated Swedish botanist and traveller, found it necessary to apologise for obtruding upon the public a book of travels, because the booksellers' shops were already loaded with them. I need not follow his example, however, for this volume lays no claim to be merely a book of travel. It is rather a *pot pourri* of my impressions and experiences on a botanical tour in South Africa, with an account of the plants that I saw on the way.

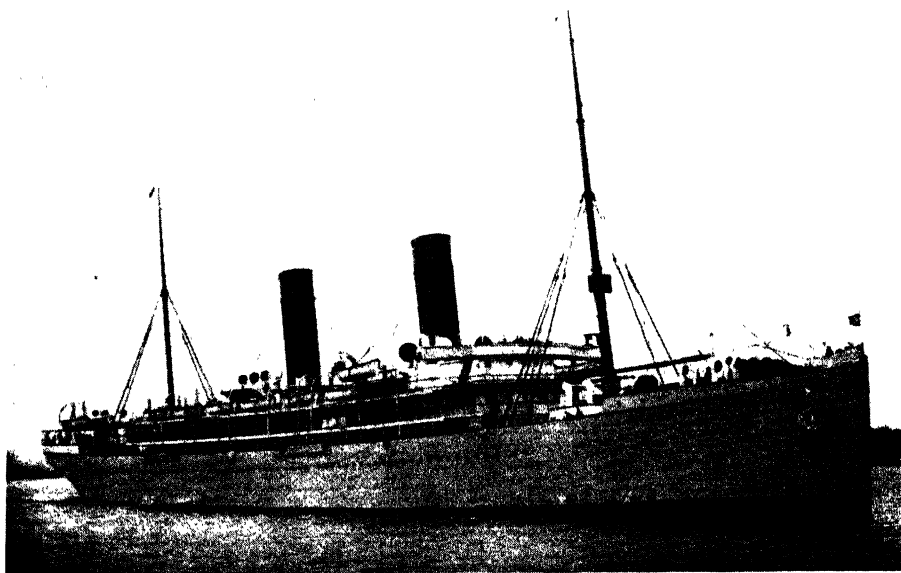
In describing the sea-passage in this first chapter, I shall have to claim the indulgence of those fortunate people to whom a voyage to South Africa is more or less a humdrum experience. For me it was to be something much more. *I was going to Africa*, and I naturally looked forward to it with keen anticipation!

Although a student of African botany for many years, I had not so far set foot on the "dark continent", my farthest south having been a visit to Madeira and the Canary Islands in 1912¹ with one of my colleagues from the Kew Herbarium. So it was indeed a great day in my life when I stepped aboard the R.M.S. *Saxon* on July 27th, 1928, *en route* for a botanical tour in South Africa on behalf of the Royal Botanic Gardens, Kew.

I had no reason to expect a voyage to the Cape such as was often experienced by the earlier travellers, when the average duration was usually several months, and sometimes accompanied by considerable hardship. Thunberg, for example, started for South Africa on December 30th, 1771, and arrived in Table Bay three and a half months later, on April 16th, 1772. On landing he records that with mutual joy the members of the ship's company congratulated one another on being delivered from many dangers; and no wonder, for on the way many of them had suffered agonies through the cook having mistaken a quantity of white-lead for flour and mixed it in some pancakes!

Fortunately we had a more careful cook on the *Saxon*, and our only trial was the lethargy of the last few days, a condition incidental to most long voyages, when even the excellent fare provided begins to pall, when the french beans taste, or seem to taste, almost the same as the potatoes, and even the expert may have difficulty in distinguishing the mutton from the veal. At the end, however, instead of beating for days against contrary winds outside Table Bay, as Thunberg did, we sailed majestically into harbour exactly to schedule shortly after dawn of the seventeenth day.

¹ See Sprague and Hutchinson in *Kew Bulletin*, 1913, pp. 287-299.



[By courtesy of the Company.]

We sailed away to the strains of "Auld Lang Syne".
The S.S. *Saxon*, Union Castle Steamship Company.



A typical figure on a Union Castle Liner; the Quartermaster of the *Saxon*.

The Island of Madeira

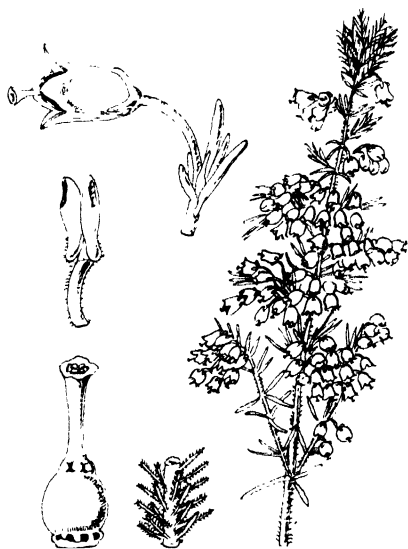
The mail-boats of the Union Castle Steamship Company call only at Madeira, and on the outward voyage land is usually sighted only once afterwards, and then in the very early morning when the great African continent is approached closely at Cape Verde, the Canary Islands being passed during the night.

The bay at Funchal, Madeira, is only three and a half days from Southampton, and it never fails to take one's breath away. The lofty mountains seem to end right in the deep blue sea, and the red-roofed white houses of the town are framed in greenery on the steep slopes as far as the eye can see.

I visited the late Dr. Grabham, then over ninety years old and a most charming and interesting personality. He had a beautiful garden some distance up the mountain, and was a keen collector of clocks, a hobby I had not observed in anyone before. He was also a very accomplished musician, and I had the privilege of hearing him play the organ on the occasion of my visit. I only realised Dr. Grabham's great age when later I found that he had published a paper on the climate and resources of Madeira so long ago as 1860, twenty-four years before I was born! During a walk around his garden I observed many interesting plants, among them being a tree of *Magnolia grandiflora* Linn. 60 ft. high, with a trunk 6 ft. in circumference; and a Tulip-tree, *Liriodendron tulipifera* Linn., about 80 ft. high and with a trunk 12 ft. around; whilst a fine example of *Cycas revoluta* Thunb. was over 8 ft. high.

In the town of Funchal one feels immediately transplanted into the tropics. At a low level the climate is warm and relaxing and most tropical plants requiring moist conditions may be grown to perfection. The streets and gardens are full of exotic species which the visitor from Northern Europe has seen only in greenhouses or not at all.

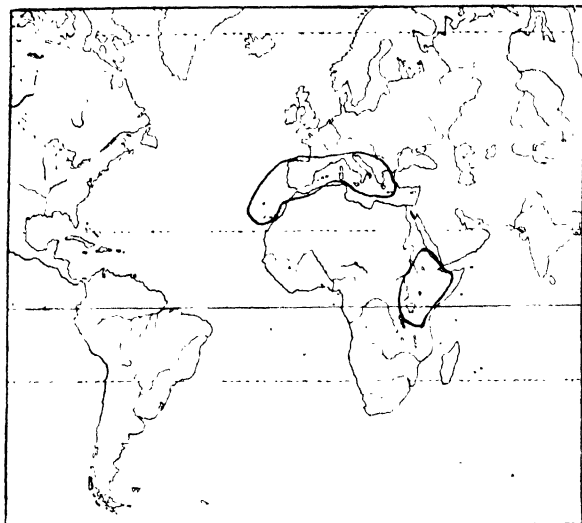
A great part of the Island of Madeira is under cultivation, and the mountain slopes are planted largely with *Pinus pinaster* Ait., there being no indigenous pine, as there is in the Canaries. The tree heath, *Erica arborea* Linn., which is widely spread in Southern Europe and on the mountains of tropical East Africa, grows wild here and is common on the upper slopes. In the Mediterranean and in North Africa it occurs at low altitudes, and ascends to higher parts farther south; for example in Madeira it grows from 2000 to 3500 ft., in the Canaries 4000–5000 ft., and from 7000 to 11,000 ft. in the high



Erica arborea L., the Tree-Heath of Madeira and the Canaries; also in Mediterranean countries and in the mountains of East Africa (see map, p. 4).

mountains of East Africa, ranging from Eritrea to Tanganyika Territory. There is another tree-heath in Madeira, *E. scoparia* Linn., which also occurs in the Canaries, and may be seen in the Las Mercedes Wood, Tenerife. The other woody plants of the island are of considerable interest, and are mainly of tropical origin and belong to tropical families. There is an endemic *Sideroxylon*, *S. Marmulano* Banks ex Lowe, a variety of the Olive, *Olea europaea* Linn., and a near relative, *Notelaea excelsa* Webb, and several conspicuous trees of the Laurel family, such as *Persea indica* Spreng., *Apollonia canariensis* Nees, *Oreodaphne foetens* Nees, and *Laurus canariensis* Webb & Berth.

A complete *Flora* of Madeira has never been written, the Rev.



Range of *Erica arborea* Linn.

In South Europe and North Africa this species grows at low altitudes, in Madeira and the Canaries in the middle altitudes (2000-5000 ft.), and in the mountains of East Tropical Africa at high altitudes (7000-11,000 ft.). It is not found on the Cameroons Mt., in West Africa.

R. T. Lowe, who studied the plants of the island, having perished in the ill-fated *Liberia* off the Scilly Isles in April 1874. Before his death, however, about three-quarters of his *Manual* was fortunately published. But a list of the plants of the island was issued in 1914 by C. A. Menezes, a Portuguese botanist. The best guide is, of course, Brown's *Madeira, Canary Islands, and Azores*, published by the Union Castle Steamship Company, whilst the *Flowers and Gardens of Madeira*, by Ella

du Cane, is a book which should give the general reader a very good idea of the island and its floral beauties.¹

The Canary Islands

The Canary Islands are passed during the night, the course being between Tenerife and Gomera. Most of them are of volcanic origin, and, in contrast with Madeira, at a distance appear anything but

¹ See also J. Bornmüller, "Ergebnisse zweier botanischer Reisen nach Madeira und den Canarischen Inseln", *Engl. Bot. Jahrb.*, **33** : 387-492 (1903).

M. Vahl, "Über die Vegetation Madeiras", *Engl. Bot. Jahrb.*, **36** : 253-349 (1905).

F. Holl (of Dresden), "List of Plants Observed in the Island of Madeira", *Hooker's Journal of Botany*, **1** : 15-22 (1834), and R. T. Lowe's "Notes and Observations" on the above, *l.c.*, 22-43 (1834).



Persca indica Spreng. (LAURACEAE), from the laurel forest of the Canary Islands; endemic.

inviting to the traveller. They bear a flora,¹ however, of very great interest. For example, the famous "Dragon trees", *Dracaena Draco* Linn., catch the eye of the visitor at once. The layman might be

¹ The classical work on the phanerogamic flora of the Canaries is that of Barker-Webb and Berthelot, published in 1840 in three quarto volumes and two volumes containing 252 magnificent plates. For a complete list of the plants of the Archipelago the reader is referred to Pitard and Proust, *Les Iles Canaries : Flore de Archipel*; Paris, 1908.

See also: D. H. Christ, "Vegetation und Flora der Canarischen Inseln", *Engl. Bot. Jahrb.*, **6**: 458-526 (1885).

H. Christ, "Spicilegium canariense", *Engl. Bot. Jahrb.*, **9**: 86-172 (1888).

J. Bornmüller, "Ergebnisse zweier botanischer Reisen nach Madeira und den Canarischen Inseln", *Engl. Bot. Jahrb.*, **33**: 387-492 (1903).

For the islands of Lanzarote and Fuerteventura see C. Bolle, "Botanische Rückblicke auf die Inseln . . ." in *Engl. Bot. Jahrb.*, **16**: 224-261 (1893).

surprised to learn that this tree has hitherto been included in the Lily family, LILIACEAE. It is found wild only in the Canary Islands. Then near the coast one often meets with huge clumps of the Canary *Euphorbia*, *E. canariensis* Linn., with its formidable spiny stems, giving the landscape the appearance of an African semi-desert. After the dry zone is left, a moist evergreen forest full of interesting species is met with. The extent of this forest is largely determined by the cloud-belt which hangs around the mountains and supplies moisture to the vegetation by condensing on the foliage. Its preservation is therefore vital to the water-supply of the islands. The Las Mercedes wood of Tenerife is a good example, and is only a short motor excursion from the steamer.

So vital, indeed, is the vegetation to the water supply that there is an interesting story about a celebrated rain tree¹ on the island of Hierro, the most western of the Canaries. Although the Canary Archipelago was probably known to the earliest voyagers, the Phoenicians and the Carthaginians, many hundreds of years before the Christian era, we know for certain that it was visited by Roman navigators during the reign of Juba II, King of Mauritania, about 25 B.C. The Romans regarded the islands as being the western boundary of the world, and Pliny has given us Juba's account of them, in which he mentions a tree from which water was obtained. The particular tree of Hierro is supposed to have been *Oreodaphne foetens* Nees, one of the Laurel family, LAURACEAE. It grew in a hollow on a hill, and whilst in the heat of the day it drooped, in the night time it condensed enough water from the clouds to supply the whole island. Beneath this precious tree a stone well was built to conserve the water. The Spanish name for it was *El Garre*. So famous was this tree at the beginning of the seventeenth century that pictures of it (reproduced on p. 8) were used as frontispieces in contemporaneous herbals.

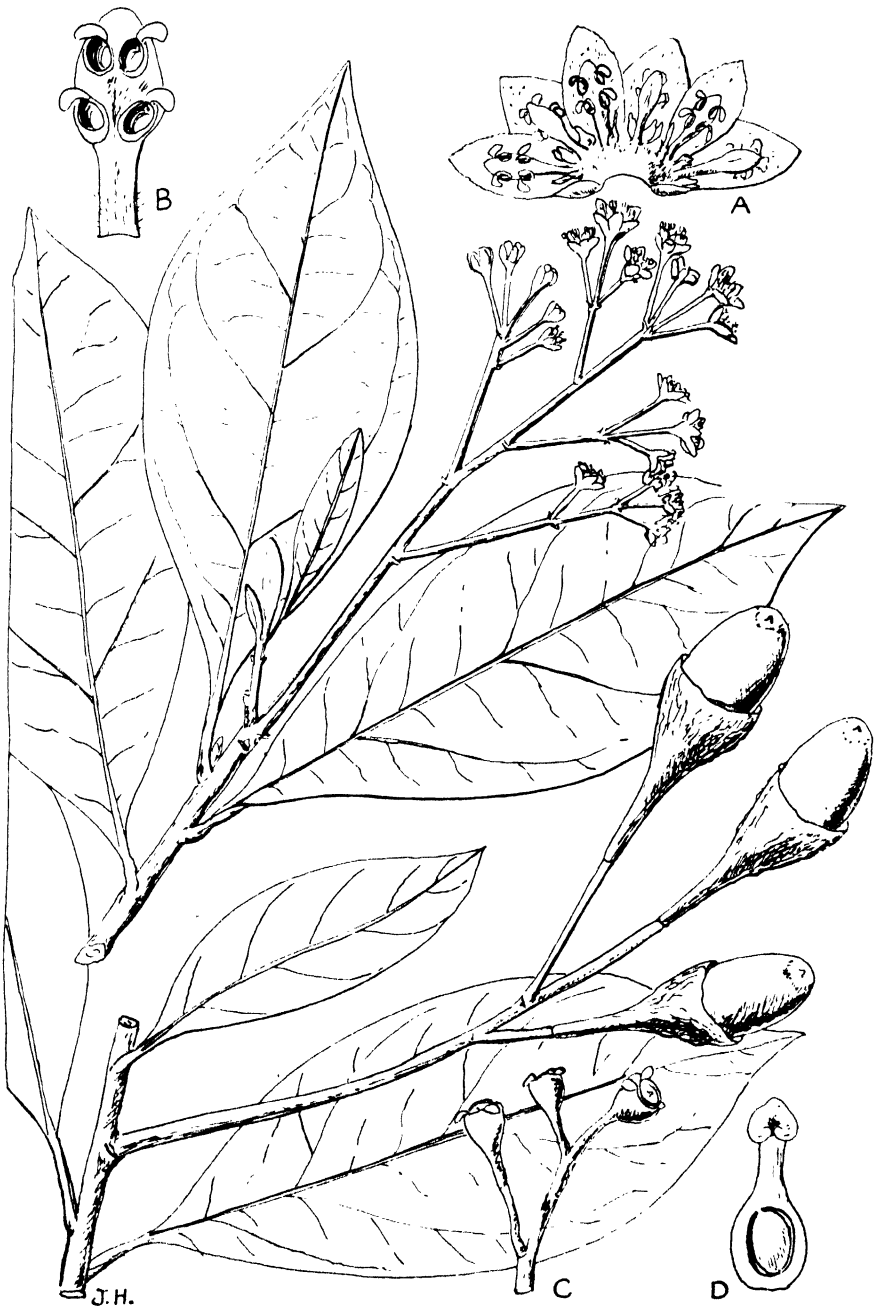
A very important tree in the Canaries is the native pine, *Pinus canariensis* C. Sm., which has been introduced and planted extensively in South Africa and other countries. It is found wild only in the Canary Islands, and being so isolated is of considerable interest because its nearest relative grows in Mexico, on the other side of the Atlantic. Pieces of Canary Pine wood have been found among drift carried off by the Gulf Stream even as far as the coast of Norway. A fossil species, which seems to be very closely allied, has been found in the lava of the Cantal district, South Central France.²

The remainder of the evergreen forest of the Canaries is largely made up of four species of Lauraceous trees, *Phoebe barbusana* Webb & Berth., *Oreodaphne foetens* Nees, *Laurus canariensis* Webb & Berth., and *Persea indica* Spreng., all of which occur in Madeira, and the latter two in the Azores.

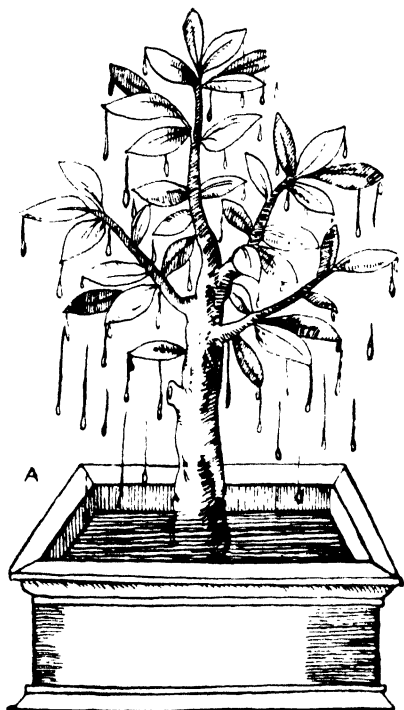
Just before the Great War of 1914, I was fortunate enough to make a botanical expedition to the islands with a colleague from Kew (see reference at foot of p. 1). After spending a short time on the island of Tenerife, we proceeded by the inter-island steamer to the island of La Palma, one of the most western of the group. There we

¹ For a full account of this see Hutchinson in *Kew Bulletin*, 1919 : 153.

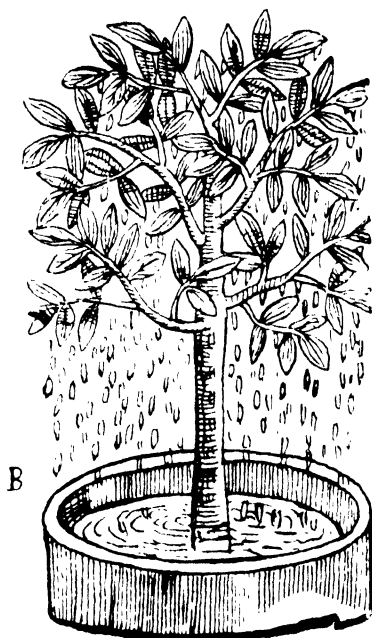
² See Hutchinson in *Kew Bulletin*, 1918 : 1-3, figs. 1-2.



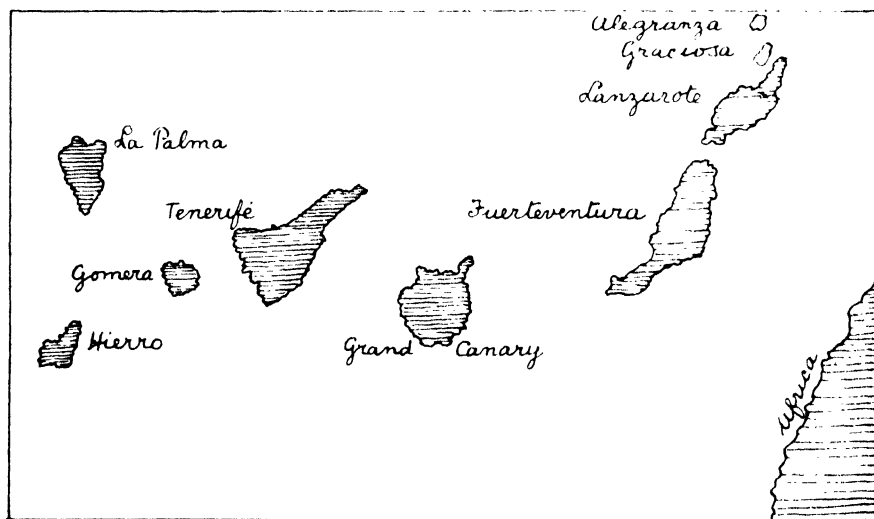
The " Rain-tree " of the Canary Islands, *Oreodaphne foetens* Nees (LAURACEAE),
see p. 6.



The Rain Tree of the Canary Islands as shown by Duret, *Histoire Admirable* in 1605.



The Rain Tree as shown on the frontispiece of Bauhin and Cherler's *Historia Plantarum Generalis* in 1619.



Sketch map of the Canary Islands showing their relative positions to the west coast of Africa.

spent three weeks exploring for plants and collecting for the Kew Herbarium, camping out for some time in the great crater, or Gran Caldera. The bottom of this great crater, wherein now runs a river, is less than 1000 ft. above sea level, and the highest part of the surrounding walls is nearly 8000 ft. altitude. The scenery in such a place is therefore magnificent, the upper part of the inside of the rim being composed of precipices 2000–3000 ft. high.

The Canary Archipelago is remarkable for the large number of endemic species of flowering plants and ferns—that is to say, species

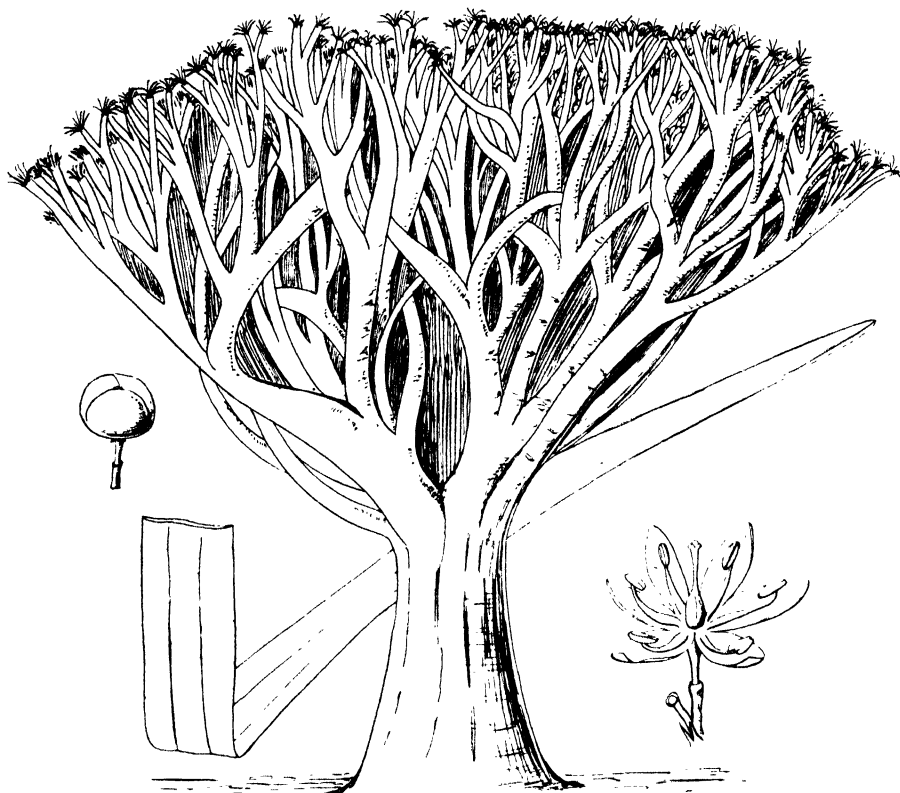


Canarina Campanula Linn. (CAMPANULACEAE), from the Canary Islands.

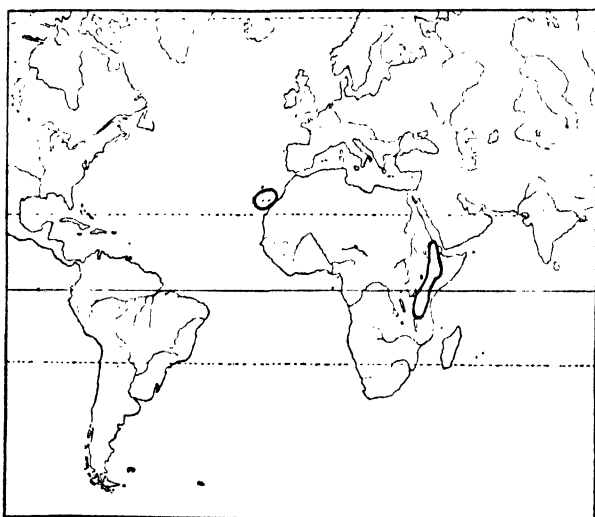
The genus is also found in East Africa (see map on p. 10), where the species are very similar.

which occur in these islands and nowhere else. Of these there are over 300 peculiar to the Canaries. Among the species with restricted distribution are six which occur also in Madeira and the Cape Verdes, eleven species common to the Canaries and the Cape Verdes, and twenty-eight species are shared by the Canaries and Madeira. There are as many as forty-one endemic genera—a very high proportion indeed.

A genus of particular interest, on account of its distribution, is *Canarina*, belonging to the Campanula family (CAMPANULACEAE). There is one species in the Canaries, *Canarina Campanula* Linn. (see above), and there are one or perhaps two species in the mountains of



The "Dragon Tree" of the Canary Islands, *Dracaena Draco* Linn. (AGAVACEAE), with leaf, flower and fruit.

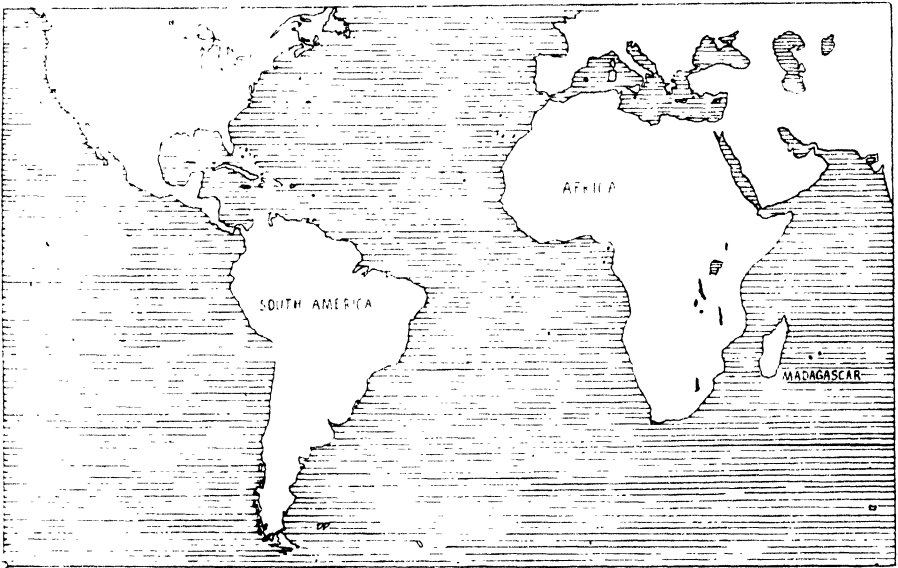


Range of the genus *Canarina*, of the Campanula family (CAMPANULACEAE).

East Africa ranging from Abyssinia to north of Lake Nyasa, where they are often found hanging from trees in the forest from 5600 to 9000 ft. altitude. This genus is a very interesting example of discontinuous distribution, and I am somewhat at a loss to explain it. It seems probable that at one time *Canarina* occurred in suitable localities in more or less continuous forest right from the Canaries to East Africa, and that it has disappeared from the intervening countries through changes of climate (see map on p. 10).

* * * * *

This voyage was indeed a contrast compared with that of Thunberg! Contrary winds perhaps inconvenienced us a little in regard to our comfort on deck, or a following North-East Trade tended to make life on board somewhat trying. The latter we experienced two



Sketch map showing the similarity of the western coast of Africa and the eastern coast of South America. Their floras are closely related.

days south from Madeira. Next morning, however, there was a fresh head-wind and life on board was brisk once more and we were ready to begin the sports so well organised. A swarm of "Mother Carey's Chickens" following the ship indicated that we were not so very far from land.

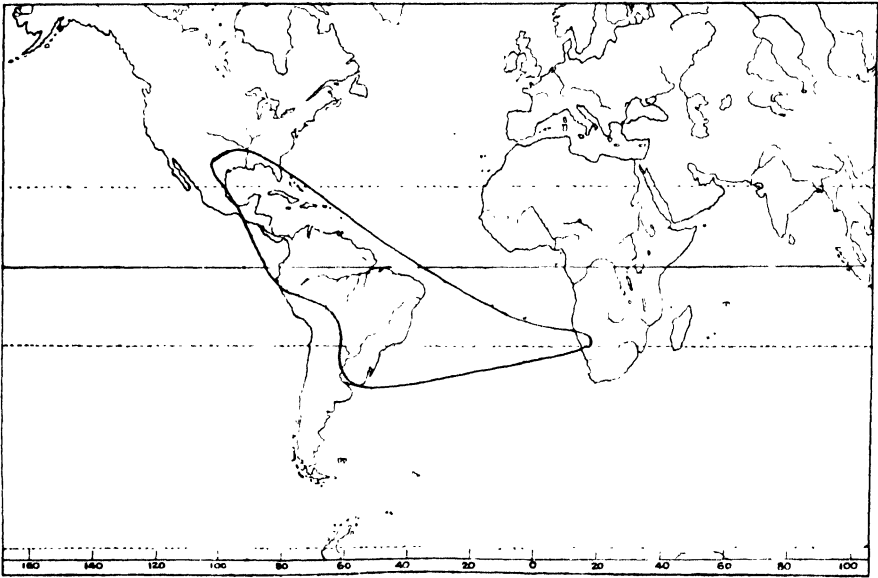
I had often wondered what the weather would be like at sea in these latitudes, and I was surprised at the cool, fresh breeze on approaching the equator, which was crossed in the night on the outward voyage. It was a little difficult to realise that we were passing from summer to winter, for the sun was now to the north of us, and it was still winter in the Southern Hemisphere.

In the early morning of August 3rd we passed very close to the mainland at Cape Verde, and I have a note in my diary of being quite thrilled to see a small part of "our area", probably all that I should

ever see ¹—a low strand with two small hills near the seashore, and behind these a fairly dense growth of palms. My interest in this coast is considerable, for I have studied and described nearly every one of the known flowering plants of the region, being the joint author of the *Flora of West Tropical Africa*.²

Former land-connection between Africa and South America

The flora of this part of the coast is closely related to that of Brazil, a fact which lends considerable support to Wegener's idea that Africa and South America were at one time united. As Wegener ³ points out, the outlines of the two coasts fit almost exactly into each other if cut up and placed together (see outline map, p. 11).



Range of MAYACACEAE, a monotypic monocotyledonous family with one species, *Mayaca Baumii* Gürke, in Angola, West Africa; remainder in America.

Wegener's theory is known as the *Displacement Theory*, and this striking similarity of the Eastern South American and West African coasts was the starting point of a new conception of the earth's crust and of its movements. It assumes that the continental masses of land underwent great horizontal drifting movements during the course of geological time and that they are still drifting. Wegener says (p. 2) :

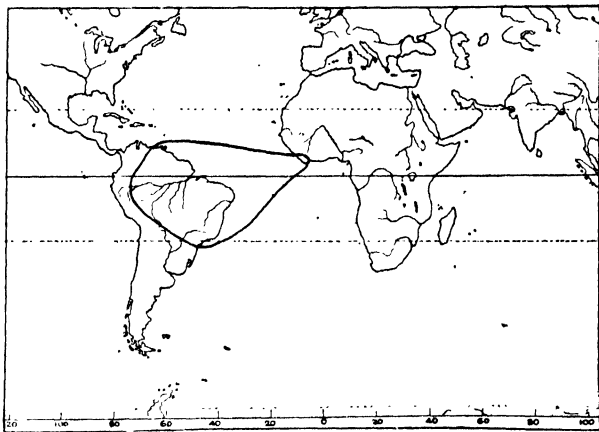
“ According to this idea, to take a particular case, millions of years ago the South American continental plateau lay directly adjoining the African plateau, even forming with it one large connected mass. This first split in Cretaceous times into two parts, which then, like floating icebergs, drifted farther and farther apart.”

¹ I have since visited the Cameroons Mountain in West Africa.

² J. Hutchinson and J. M. Dalziel, *Flora of West Tropical Africa* (Crown Agents for the Colonies, 1927-1936).

³ A. Wegener, *The Origin of Continents and Oceans* (Methuen & Co., Ltd., London, 1924).

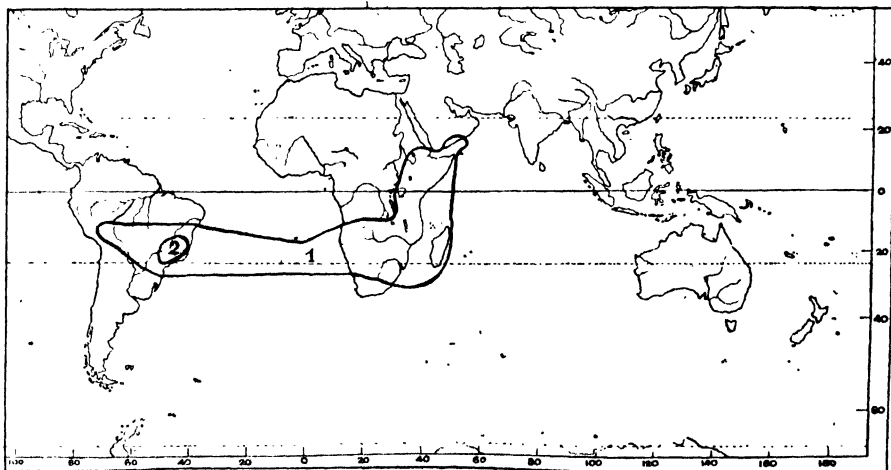
As a botanist who has studied the distribution of plants for many years, particularly African plants, I am a firm believer in Wegener's ideas. In support of this I shall give only three examples from my



Range of RAPATEACEAE, a family of Monocotyledons; American except for one genus, *Maschalocephalus*, in Liberia.

book on Monocotyledons,¹ and would refer the reader for further information to Irmscher's comprehensive paper on the subject.²

These three examples are : (1) the MAYACACEAE, a peculiar Mono-



Range of VELLOZIACEAE : 1, *Vellozia* ; 2, *Barbacenia*.

cotyledonous family of one genus, with a wide range in North and South America, and one endemic species in Angola, West Africa ; (2) the RAPATEACEAE, all from eastern tropical South America except

¹ J. Hutchinson, *Families of Flowering Plants*, Vol. II, *Monocotyledons* (Macmillan & Co., 1934).

² E. Irmscher, "Pflanzenverbreitung und Entwicklung der Kontinente", *Mitt. Inst. Allgem. Bot. Hamburg*, 5 : 17-235 (1922).

one monotypic genus, *Maschalocephalus* in Liberia, West Africa; and (3) VELLOZACEAE, a small but very natural family of two genera, one, *Barbacenia*, endemic in Brazil, the other, *Vellozia*, common to South America and Africa, extending to Madagascar and southern Arabia.

It is difficult to find a better explanation of the distribution of these peculiar families (and there are many other families¹ or genera which have a similar range) than some such hypothesis as that expounded so ably by Wegener.

The reader making this voyage, then, either actually or following the pages of this book, should realise that he is perhaps sailing along a course that was once *terra firma*, through a region from which the land has floated westward and is now South America.

Again Wegener says (*l.c.*):

"Similarly, it will be assumed that Antarctica, Australia and India lay adjoining South Africa, and with the latter and South America formed, until the beginning of the Jurassic period, a single large—even if partly submerged at times by shallow water—continental area, which in the course of the Jurassic, Cretaceous and Tertiary times split and crumbled into smaller blocks which drifted away from each other in all directions."

For full details of this interesting theory the reader should consult Wegener's book. Any botanist who has studied the floras of South Africa and Australia, or of Madagascar and India, cannot but be struck by their close relationships respectively, which may best be accounted for by the displacement theory. There is, of course, the possibility of the parallel development of similar types of plants in these now widely separated areas, but the generic and sometimes specific affinities are occasionally so very close that one can hardly believe the latter to have been possible, or that land-bridges were the means of distribution. I shall return to this subject when dealing with the origin and relationships of the flora of Southern Africa, which has some very significant features (see p. 133), but trust that in the meantime I have whetted the appetite of the reader to learn more about the fascinating subject of the *displacement of continents* by reading Wegener's book.

The Cape Verde Islands

Unfortunately, on our voyage we are not lucky enough to see the Cape Verde Islands, some 200 miles to the westward of Cape Verde itself. The flora of these islands has been very little investigated, and the group has only been visited by a few botanists in the earlier part of last century, and who were mostly on their way to more fertile regions. In former times sailing vessels usually called at one or other of the islands, and the short visit permitted of a few plants being

¹ Another very striking example has recently been discovered in French Guinea by M. Jacques-Félix. This belongs to the Pine-Apple family, BROMELIACEAE, hitherto known only from America. Dr. Chevalier described this plant as a new genus of LILIACEAE, but German botanists have transferred it to be a species of *Pitcairnia*, *P. Feliciana*, a large South American genus of BROMELIACEAE, thus adding another very important link between the continents (see "*Willrussellia Feliciana* A. Chev." in *Bull. Soc. Bot. Paris*, 84 : 502 (1937); and H. Harms and J. Mildbraed in *Notizbl. Bot. Gart. Berlin*, 14 : 118 (1938).

gathered. As the Hookers¹ remarked in their notes on the botany of the Niger Expedition :

"There are many . . . circumstances connected with these islands which keep the mind busy while in their neighbourhood. They form the western extreme of the old world, of what was once the whole world to civilized man till within the last few hundred years, and hence, with the North Cape and Cape of Good Hope, they constitute the three salient points in the geography of the eastern Atlantic. . . . The hitherto unexplored mountains of the Cape de Verdes rise 8000 ft. and upwards above the sea, in serried ridges and isolated peaks, promising a rich harvest to some botanist, who may in those higher and cooler parts of the islands rely on immunity from disease. There he may expect to find new types of plants."

These remarks were published as long ago as 1849, and they may be repeated to-day with almost equal force. No doubt the higher parts of the islands would repay a thorough botanical investigation, and further interesting facts concerning geographical distribution might be brought to light. Our knowledge of the flora was summed up as long ago as 1852 by J. A. Schmidt in a work entitled *Beiträge zur Flora der Cap Verdischen Inseln*, printed at Heidelberg, and since my own voyage my friend Dr. A. Chevalier of Paris, a well-known African explorer, has visited the islands and compiled a list of plants.² Like St. Helena and other Atlantic islands, the effects of man and beast on the flora of the islands are only too painfully evident at the present day.

St. Helena

The mail³ steamers of the Union Castle Company do not call at either Ascension or St. Helena. Towards the close of the twelfth day we were in the neighbourhood of the latter, which has often been described as the most solitary island of the South Atlantic. Although over 1000 miles distant from the African continent, and nearly 1700 miles from the Cape Peninsula, the flora of the island shows considerable affinity with that of the Cape. About forty species of flowering plants were formerly known to be endemic in this island, but many of these have now disappeared owing to cultivation and the voracity of the goat, which was introduced into the island in 1513, and multiplied so rapidly that in 1588 Captain Cavendish stated that they existed in thousands, single flocks being almost a mile long. Had it not been for William Burchell, who later made a great name as a naturalist in Southern Africa, we should have known very little about the native plants of the island. He spent five years there (from 1805 to 1810), and made an excellent collection of plants, which are in the herbarium at Kew. To-day the indigenous flora is confined to a few patches on the top of the central ridge, 2700 ft. above the sea.

An excellent account of the island was published in 1875 by J. C.

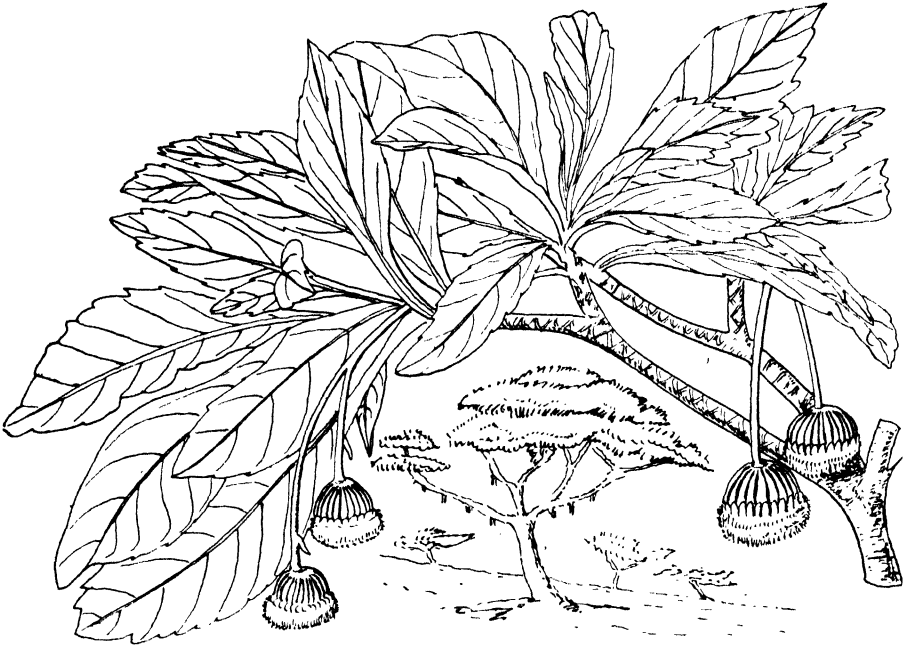
¹ W. J. Hooker and J. D. Hooker, *Botany of the Niger Expedition*, 86 (1849).

² See A. Chevalier, *Revue de Botanique Appliquée et d'Agriculture Tropicale*, Nos. 170-171, Oct.-Nov. 1935 (Paris).

See also E. H. L. Krause, "Flora der Insel St. Vincent in der Capverden-gruppe", *Engl. Bot. Jahrb.*, 14 : 394-425 (1891).

³ Previous to the war the Intermediate Steamers from London usually called at both these islands.

⁴ J. D. Hooker, *Lecture on Insular Floras* (Brit. Assoc. Nottingham, 1866).



Commidendron robustum DC., a curious Composite tree endemic in the island of St. Helena (after Melliss).

Melliss, with interesting chapters on the geology, fauna, and flora. The last-mentioned especially is of great interest from a phyto-geographical standpoint. As noted above, it shows a close relationship with the flora of South Africa, having native species of such typically Cape genera as *Phyllica*, *Pelargonium*, *Mesembryanthemum*, *Osteospermum*, and *Wahlenbergia*.



Melanodendron integrifolium DC., a curious Composite tree endemic in the island of St. Helena (after Melliss).

The daisy family, COMPOSITÆ, is represented by most weird and peculiar arboreal species similar to those found only in the East African mountains and in the Andes of South America. Some of the more interesting are *Commilendron* (see figure, p. 16), a genus related to the Olearias and Asters of our gardens. It "was probably once the most abundant plant in the island and covered much of the lower zone of the land at that period when verdure clothed those parts which now show only sterility and barrenness. . . . It grew to a height of 20 ft., with a crooked, rugged, black, lichen-covered stem surmounted by a flat umbrella-shaped mass of pale blue foliage" (Melliss). I give a copy of Melliss' drawing of this remarkable tree, and of another, *Melanodendron integrifolium* DC., the native Black Cabbage-tree, about 15 ft. high, growing on the central ridge. The latter is covered with white flower-heads in the months of October and November.

The original flora of St. Helena has been aptly termed "a fragment from the wreck of an ancient world", for when discovered over 400 years ago the island was entirely covered with forests, the trees drooping over the tremendous precipices that overhang the sea, a vivid contrast with present-day conditions. Now the bulk of the flora consists of exotic species which have assisted in the destruction of the native plants. What a pity man and beast have almost destroyed this museum of antiquity!

After Burchell, who published nothing about the flora, a celebrated Indian botanist, Dr. Roxburgh, stayed for a year (1813-1814) in the island, and he drew up an alphabetical catalogue of the plants, which was published as an appendix to Beatson's ¹ *Tracts Relative to the Island of St. Helena* in 1816. This was reprinted and arranged after the Linnean System by Watson in 1825 under the title *Flora Sta. Helenica*, and in the same year were published the *Mémoires du Dr. F. Antommarchi, ou les derniers momens De Napoléon*, which also contained an account of the flora.

The late Sir Daniel Morris, at one time Assistant Director of Kew, visited the island in 1883, and wrote an interesting report ² on the agricultural resources.

* * * * *

Having passed the latitude of St. Helena, we soon began to approach the great continent of Africa, on which I was to land on the morrow. Naturally I was thrilled with anticipation. I have tried in the space of the next short chapter to give the reader some idea of its floristic wealth and characteristics, which I had up to that time been able to study only in the cupboards of the Kew herbarium.

¹ Major-General Alexander Beatson, one time Governor of St. Helena.

² *African*, No. 275. Colonial Office, January 1884.

Chapter II

GENERAL ACCOUNT OF THE FLORA OF AFRICA¹

WE are told by geologists² that the African continent has a simpler structure than any other, although it has many unique features and formations. It consists essentially of a plateau of which the rocks have not been bent into steep folds by compression since primeval times, except for a strip in Cape Colony, which was part of an ancient southern continent, and for the Atlas Mountains, which are geologically and biologically European. The continent between these remote chains of fold mountains has undergone no close folding, *and most of it has remained above sea-level since the time of the oldest known fossils.* The plateau has been fractured and cleft by earth movements which occasioned widespread volcanic eruptions: but the plateau surface has remained a land area on which plants and animals have evolved continuously, subject to the stimulus of changing climate, but never interrupted by submergence. According to orthodox geology, Africa is part of an ancient continent which included most of South America, India, and Australia. This southern continent was separated from the contemporary northern island of Eurasia, except for an occasional isthmus, by a sea, the Tethys, which extended from central America through the Mediterranean and across southern Asia to the Eastern Archipelago. The range of this southern continent is best established in Carboniferous times. By the Jurassic its disruption had begun by subsidences³ which formed the Atlantic and Indian Oceans, introduced great changes in its biological relations, and repeatedly caused widespread volcanic eruptions.

The character of the vegetation of Africa is largely determined by the distribution of heat and moisture, coupled with the great range in altitude. Phytogeographically the continent may be primarily divided into four sections (see map, p. 20): (1) a northern extra-tropical region, bordering the southern shores of the Mediterranean and gradually fading into and including the northern Sahara desert, the latter with a very scanty flora; (2) a tropical African region, bounded approximately on the north by the Tropic of Cancer; (3) a South African region, reaching as far north as the Limpopo, Lake Ngami, and the Kunene river in southern Angola; and (4) a Cape Region, a narrow strip in the south and south-west, with a flora closely related to that of Australia and very different from the remainder of Africa. According to Thonner (*Flowering Plants of Africa*, 1913), there are in Africa about 3712 genera and over 40,000 species of flowering plants, a number constantly being added to by the discovery of new species.

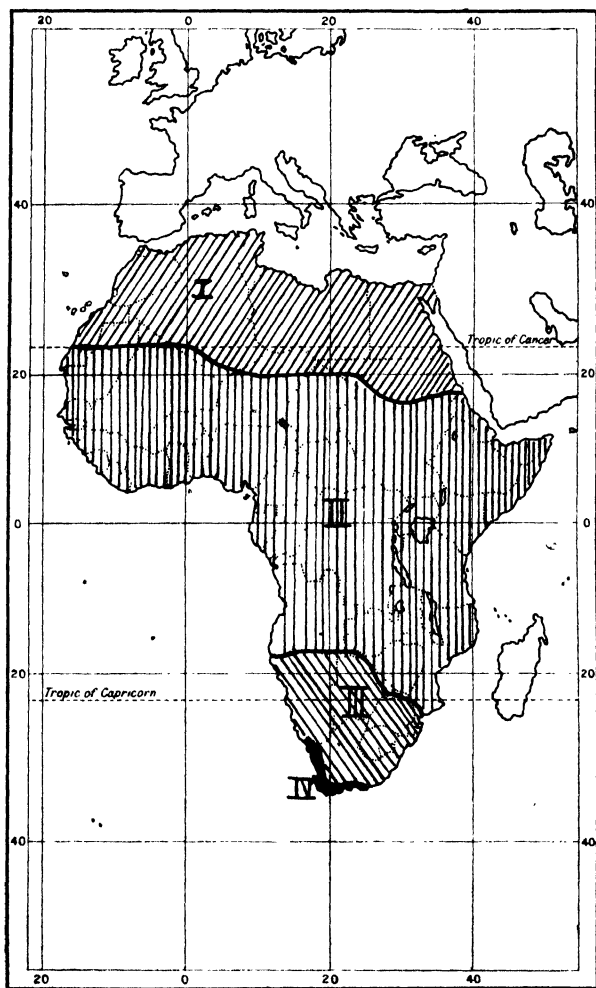
¹ This section is largely the same as contributed by the author to the *Encyclopaedia Britannica*, 14th ed. (1929), and included here by kind permission of the editors.

² See *Encycl. Brit.*, l.c.

³ See p. 12, where the *Displacement Theory* of Wegener is supported as being more probable.

The Flora of North Africa

The northern area of Africa contains a considerable proportion of genera and species common to the south of Europe, besides a large number of endemics in and south of the Atlas Mountains and in Morocco. In the Atlas Mountains the Atlantic cedar (*Cedrus atlantica* Manetti) is a characteristic tree, and is very closely related to species in Asia Minor and the western Himalayas, some authorities having



Major botanical regions of Africa: I, MEDITERRANEAN REGION. II, TROPICAL AFRICAN REGION. III, SUBTROPICAL SOUTH AFRICAN REGION. IV, "CAPE" REGION.

The "Cape" Region has a flora quite different from that of the remainder of the continent, and is related to that of Australia. The flora of the neighbouring island of Madagascar differs largely from that of the continent, and is related to that of Ceylon and India, but more remotely to that of Australia.

considered them all to be forms of one variable species. The flora of Morocco is related to that of the Canary Islands, whilst the somewhat meagre indigenous vegetation of Egypt is largely the same as that of Palestine and Persia. The flora of the Hoggar Mountains in the central Sahara and on the line of the tropic of Cancer is quite Mediterranean.

The Flora of Tropical Africa

The tropical African flora may be roughly divided into four regions : (1) a northern desert or semi-desert region ; (2) a savannah or plateau region ; (3) a high mountain region ; and (4) the tropical rain forest.

The first region is characterised by a very scanty rainfall, and its flora consists largely of plants which are short-lived, such as annuals, or those specially adapted to resist long periods of drought. These include the date-palm (*Phoenix dactylifera* L.), which grows where other vegetation is practically non-existent.

The transition from the semi-desert to that of the savannah is usually gradual, with an increase in annual rainfall and pronounced wet and dry seasons. In the savannah the low, thorny bushes of the desert are replaced by scattered trees and shrubs, giving the country a park-like appearance, with an undergrowth of grasses and herbaceous flowering plants, including numerous annuals and species with underground rootstocks. This vegetation is typical of the elevated plateau-region which occupies a large portion of the continent. Characteristic trees are the Baobab (*Adansonia digitata* Linn.), the Shea-butter tree (*Butyrospermum Parkii* Kotschy), *Anogeissus Schimperi* Hochst., *Azelia africana* Smith, *Entada sudanica* Schweinf., *Parkia filicoidea* Welw., *Combretum* spp., numerous Acacias, and other thorny trees, and the Fan-palm (*Borassus flabellifer* Linn.), etc.

In general it may be stated that the desert type is steadily encroaching on the savannah, which in turn is gradually penetrating the northern limits of the forest region, a condition resulting from a combination of desiccating winds during the prolonged dry period, and of human agency, such as shifting cultivation, overstocking, and burning of the grass, with subsequent erosion.

In the drier parts of the savannah—for example in the eastern Sudan—large areas are covered by species of thorny *Acacia*, including *A. arabica* Willd., producing gum-arabic. In somewhat less arid but similar country farther south, in Rhodesia, south-east Belgian Congo, and parts of Angola, another leguminous genus, *Brachystegia*, is very plentiful, and forms almost pure low forest. Farther south from southern Angola across the country south of the Zambesi to Portuguese East Africa and the extreme northern Transvaal as far south as the Zoutpansberg, the Mopane tree, *Copaifera Mopane* Kirk, is dominant, in growth resembling a pear tree, with huge Baobabs dotted here and there.

In the very arid, desert, coastal areas of south Angola and Damara-land a unique example of the vegetable kingdom, *Welwitschia Bainesii* (Hook. f.) Carr., is found, and in this region a genus of the Cucumber family, CUCURBITACEAE, *Acanthosicyos horrida* Welw., the "Naras", thrives on the sand dunes where little else is found growing. In the

savannah and neighbouring forest regions there are numerous plants with edible fruits and not a few poisonous plants, such as species of *Dichapetalum* (CHAILLETACEAE), the arrow-poison, *Acokanthera* (APOCYNACEAE), *Lasiosiphon Kraussianus* Meisn. (THYMELAEACEAE), and *Strophanthus* (APOCYNACEAE), etc.

The high mountains capping the savannah region, the Cameroons Mountain, Mount Elgon, Mount Kenya, Mount Ruwenzori, and Mount Kilimanjaro, etc., carry a flora of great interest. On one or other of these mountains it is possible to traverse almost as varied a succession of types of vegetation as might be encountered in a journey from the equator to the vicinity of either of the poles. Many of the genera found on their upper slopes are represented elsewhere only in the cool temperate regions of the northern or southern hemispheres. Some of the better-known examples of the former are *Berberis*, *Cornus*, and *Anemone*, whilst outliers from the Cape region occur, such as *Protea* and *Pelargonium*. The weird forests of tree-groundsels (*Senecio*) and the giant species of *Lobelia* are now well-known characteristic features of the East African mountains.

The evergreen forest occupies mainly the low-lying country, with a high rainfall distributed throughout the year, and extends in an ever-widening belt from the colony of Sierra Leone to the Cameroons, whence it spreads out over a large part of the Belgian Congo and the Gabun as far east as the Victoria Nyanza. This forest sometimes penetrates for a considerable distance into the drier savannah regions along the banks of rivers. It is particularly rich in endemic species of trees, shrubs, and woody climbers, some of which are of great commercial value. The most important timber-trees are the African "mahoganies" (*Khaya*, *Pseudocedrela*, *Entandrophragma*, etc.), and numerous trees of the families CAESALPINIACEAE, COMBRETACEAE, SIMARUBACEAE, and EUPHORBIACEAE. Among ornamental shrubs the several species of *Mussaenda* (RUBIACEAE), with enlarged, brightly coloured calyx-lobes, and brilliant flowered species of *Combretum*, are conspicuous. The Silk-Cotton or Kapok-tree (*Ceiba pentandra* Gaertn.), with its enormous buttressed trunk, often attains gigantic proportions, whilst in West Africa especially, the valuable oil-palm (*Elaeis guineensis* Jacq.) is abundant. As many of the peculiar genera found in this primeval forest, especially in the Cameroons and Gabun regions, are also found in the Guianas and Brazil on the opposite side of the Atlantic, it seems probable that it is but the remains of a once much more extensive and continuous tract of forest. Apart from Madagascar, the connection between the East African forests and those of Tropical Asia across the Indian Ocean is not nearly so marked.

The South African Flora

The Flora of South Africa, broadly speaking, consists of several main types, one of which is quite different from the others. This is the Cape or South-Western region, which occupies a narrow strip within the southern coastline from the Oliphants River in the west to Port Elizabeth in the south-east. In some respects its vegetation

resembles that of certain parts of Australia, the peculiar families PROTEACEAE and RESTIONACEAE and certain groups of PAPILIONACEAE being common to the two areas and rare in, or absent from, other parts of the world. The vegetation of this coastal area is of a marked xerophilous character, and bears a superficial resemblance to that of certain parts of the Mediterranean. It is of the so-called bushwood type, and here and there are tracts of grassland. Intermingled with the shrubs are numerous annuals, herbaceous perennials, succulents, etc. Farther inland, between the ranges of mountains, much of the surface is occupied by the Rhenoster bush (*Elytropappus rhinocerotis* Linn.) (COMPOSITAE).

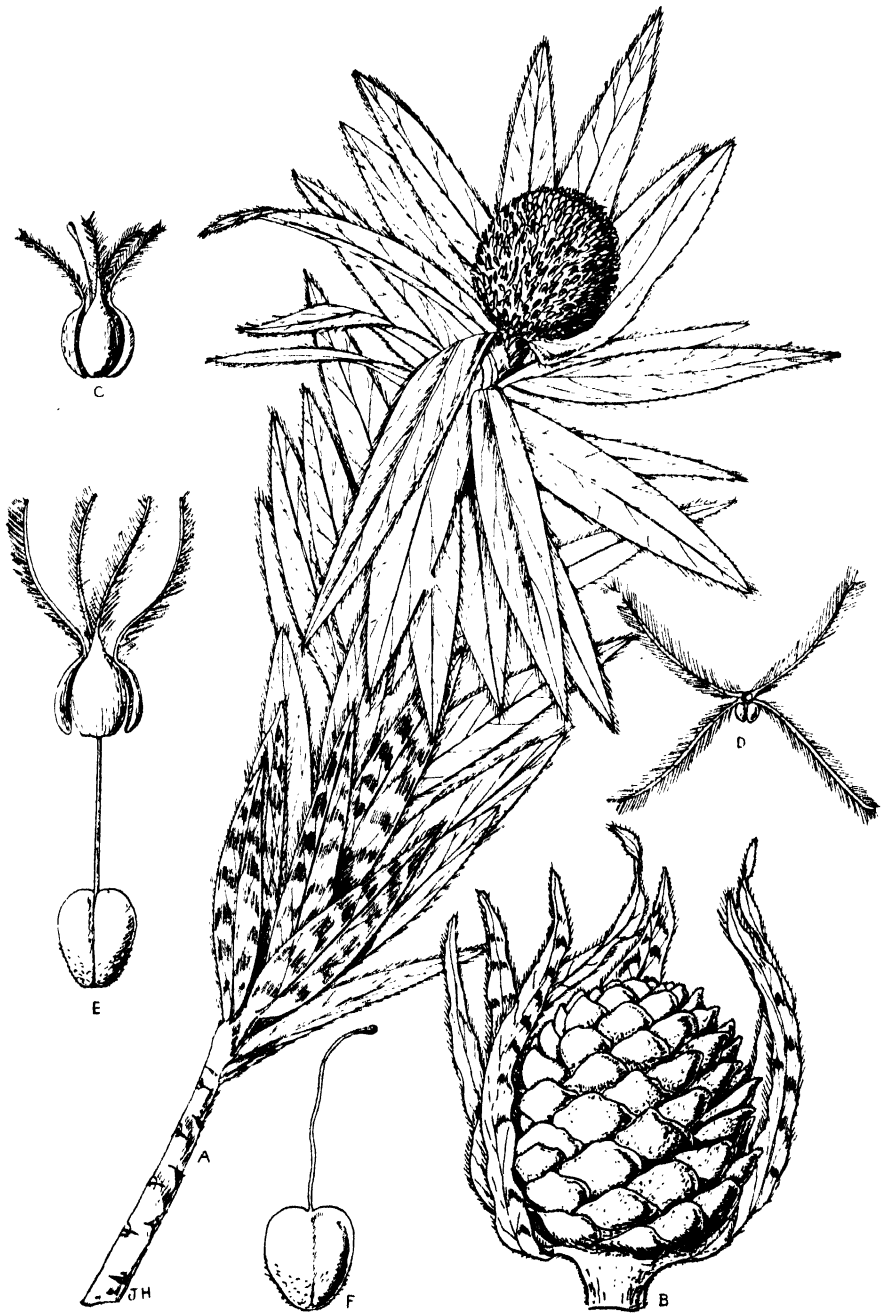
True forests occur only towards the eastern part of the region in the districts of George, Knysna and Humansdorp, and the trees composing them nearly all belong to tropical genera (see p. 223). In the north-west a few trees of a conifer, *Callitris juniperoides*, are found, being the sole remains of a once extensive forest. The Silver Tree, *Leucadendron argenteum* Linn., is now nearly confined to the Cape Peninsula, which harbours as many as 100 species of *Erica*. Other striking plants in the same district are the brilliant scarlet *Disa uniflora* Berg. and the blue *D. graminifolia* Ker-Gawl., two beautiful ground orchids. There are also numerous species of the Geranium family (*Pelargonium*) and many beautiful *Oxalis*, large numbers of which are in cultivation.

Of the remainder of the South African regions, to which a special chapter is devoted farther on, perhaps the most interesting and remarkable is the *Karoo*, which occupies a broad belt in the hinterland of the south-west region. It is mainly a vast shallow basin, which in former times was probably the bed of a large lake.

Its altitude ranges from 1800 to 4500 ft., the mountains on the northern margin reaching 8000 ft. altitude. The vegetation is of an intensely xerophytic type, composed mainly of succulents of weird and diverse form, thorn-bushes and numerous plants with bulbous and tuberous rootstocks. Trees are almost entirely absent. The predominant families in this region are COMPOSITAE, PAPILIONACEAE, and FICOIDACEAE, the last mentioned being represented by very numerous species of the genus *Mesembryanthemum* and its segregate genera. In some parts of this area the exotic *Opuntia* from Central America has become a pest.

The *Upper* and *Kalahari* regions distinguished by Bolus may for convenience be treated as one. Whilst the families mentioned above are still widely represented, the grass family GRAMINEAE takes a very high place, much of the country being grassland (high veld). Here also there is a considerable influx of families and genera characteristic of the tropical regions to the north. Among the COMPOSITAE the everlasting (*Helichrysum*) are conspicuous.

The south-east-coast region is bounded on the south-west by the Van Staadens Mountains and extends northwards east of the Drakensberg as far as the tropics, into which it gradually merges. It is essentially a southerly extension of the tropical flora of East Africa, and contains a large number of such tropical families as ASCLEPIADACEAE, ACANTHACEAE, RUBIACEAE, etc. True rain-forest and even mangroves occur in Natal. Some of the more striking plant-forms in this area



The "Silver Tree", *Leucadendron argenteum* Linn.

A, male shoot; B, female "cone"; C, female flower; D, perianth; E, parachute arrangement of the fruit and perianth.

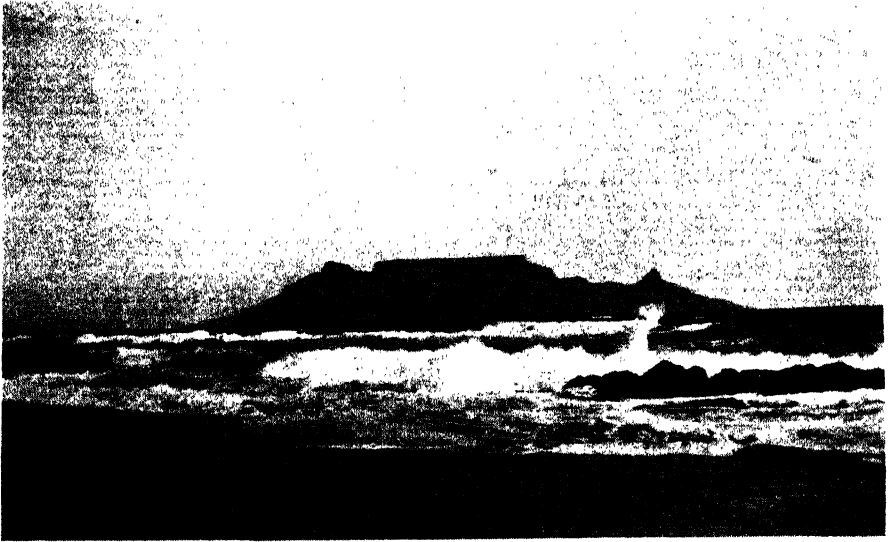
are a large tree *Euphorbia*, *E. grandidens* Haw., several species of *Encephalartos* (CYCADACEAE), and numerous species of *Aloe*. Although nearly opposite the island of Madagascar, there is scarcely anything in common between the two floras.

As in the case of the tropical flora, it seems clear, judged by the character of the vegetation, that the climate of much of South Africa is gradually becoming drier.

Chapter III

CAPE TOWN AND VICINITY

UP to a few years ago the number of botanists in South Africa might have been counted on the fingers of one hand. But at the time of my visit it was a different story, and on the quay no fewer than four botanists ¹ of international repute were waiting to meet me. Although I had heard something about the warm hospitality extended to overseas visitors to South Africa, I had never expected anything like this, and I was deeply grateful to those kind friends who welcomed me on the spot close to which had landed the long list of my botanical predecessors, such as Auge, Sparrman, Thunberg, Masson, Lichtenstein, Bowie, Macowan, Medley Wood, Bolus, Schlechter, and others.



[Photogr. by the Author.]

Table Mountain, looking across Table Bay from the foot of the Blaauwberg.

My goods and chattels soon being cleared through the customs, I was driven away to morning tea (a new experience for me at the very outset) and the discussion of future plans. I found the veteran botanist Dr. Marloth ² hale and hearty, and still as keen as ever to climb the Devil's Peak or Lion's Head and show me the gems of his beloved flora. Dr. Marloth is the author of a comprehensive, profusely illustrated book ³ on the flora of South Africa.

But I owe my first introduction to the South African flora *in situ*

¹ These were Mrs. L. Bolus, Dr. R. Marloth, Professor R. H. Compton, and Mr. N. S. Pillans, besides Mr. Griffiths, Government Physicist, on behalf of the Botanical Survey.

² Dr. Marloth died in May 1931 (see *Kew Bulletin*, 1931 : 427).

³ Marloth, *The Flora of South Africa*.

to Mrs. L. (now Dr.) Bolus and Mr. N. S. Pillans, both of whom assisted me greatly during my tour in the country. They drove me along the shores of Table Bay in the direction of Milnerton, and I observed not more than two hours after I had arrived the beauties of some of the early spring flowers which were already becoming conspicuous. It was very pleasant to be able to botanise first of all along these Cape Flats, for botanically I was on classical ground, and I was following the example of my forerunners, who gleaned their first knowledge of the South African flora from the progenitors of the very plants before me. Like Burchell : ¹

"As soon as we had passed the houses, my attention . . . was entirely engrossed by the rich and wonderful variety of plants that grew in every spot. In the bushes, weeds, and herbage by the roadside, at every step I recognised some well-known flower which I had seen nursed with great care in the greenhouses of England."

Formerly much of the flats was a waste of shifting sand and scanty vegetation, mainly composed of the native PROTEACEAE and RESTIACEAE, etc., but nevertheless the *locus classicus* for many species of plants. At the present day, however, the flats are much changed from their original condition. Part has become a residential area covered with tall, exotic pine trees, quite out of their latitude here, and the shifting sand is held firmly together by dense growths of *Acacia saligna* Lindl. (MIMOSACEAE) and other phyllodineous species introduced from Australia, which have spread with great rapidity, and have in places crowded out the natural vegetation. Even on the mountain slopes a species of Australian *Hakea* (PROTEACEAE) has become a serious pest.

My first collection ² of the Cape flora was begun in the company of Mrs. Bolus, the Curator of the Bolus Herbarium, and niece of the late Dr. H. Bolus (see p. 29). A small clump of bush on the Paradise Estate at Claremont about 3 yds. in circumference proved to be an excellent example illustrating the richness of the South-Western flora. It yielded as many as the following fifteen species : *Muraltia Heisteria* DC., *Oxalis livida* Jacq., *O. purpurea* L., *Passerina filiformis* L., *Cliffortia ruscifolia* L., *Indigofera gracilis* Spreng., *Phylica capitata* Thunb. (see figure, p. 27), *Erica viridi-purpurea* L., *Royena glabra* L., *Anthospermum aethiopicum* L., *Senecio Burchellii* DC., *Helichrysum cymosum* Less., *Gerbera pilloselloides* Cass. (see figure, p. 27), *Berkheya carthamoides* Willd., *Stenotaphrum glabrum* Trin. (almost a climbing grass) (see figure, p. 27).

So far as I remember—for I did not note the fact at the time—each of these species was represented in this particular spot by only one plant. Later I was much struck by this remarkable feature in the South African flora, *i.e.*, the comparative rarity of social species; in other words, there was little or no grouping together of plants of one

¹ Burchell, *Travels in South Africa*, 1 : 14 (1822).

² Collected on 16th August around Claremont : No. 1, *Myrica quercifolia* Linn. (MYRICACEAE); 2, *Struthiola erecta* Linn. (THYMELAEACEAE); 3, *Olea capensis* Linn. (OLEACEAE); 4, *Leucadendron adscendens* R.Br. (PROTEACEAE); 5, *Mesembryanthemum* (FICOIDACEAE); 6, *Babiana hiemalis* L. Bolus (IRIDACEAE). Cape Flats near Plumstead : 7, *Rhus glauca* Desf. (ANACARDIACEAE); 8, *Muraltia thymifolia* Thunb. (POLYGALACEAE); 9, *Anthospermum prostratum* Sond. (RUBIACEAE); 10, *Scirpus membranaceus* Thunb. (CYPERACEAE); 11, *Anthericum hispidum* Linn. (LILIACEAE).

species to the exclusion of other species. This is particularly marked in the South-Western and Karoo regions. The individuals of any particular species, even of such a genus as *Erica*, mostly occur dotted here and there at intervals or in small patches. Although South African species of plants are not social themselves, they are markedly



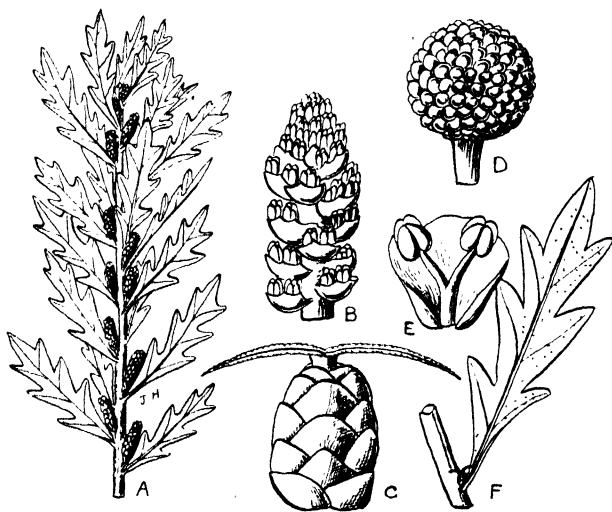
From the lower slopes of Table Mountain : A. *Phyllea capitata* Thunb. (RHAMNACEAE); B. *Gerbera piloselloides* Cass. (COMPOSITAE); B1, Achene and pappus; C. *Stenotaphrum glabrum* Trin. (GRAMINEAE).

so with other species, especially in the Karoo, where five or six different genera often grow together in clumps, affording one another protection and shade. So the struggle is not for supremacy by species against species, but there is a continual collective struggle with the climate, particularly with protracted droughts.

The richness of the flora of a few square feet of ground on the Cape Peninsula has been shown to be remarkable. It struck Burchell very

forcibly soon after he landed, for on page 18 of his *Travels* he complains that he had proceeded only a little way when his collecting boxes were full and he was compelled to turn back. He tells us that in the short distance of an English mile he collected in four hours and a half, even in the dry season, 105 different species of plants.

My second day in South Africa was occupied in visiting the beautiful botanic gardens at Kirstenbosch, some seven miles south-east of Cape Town, on the slopes of Table Mountain. Probably no gardens in the world have quite such a setting and so great a variety of scenery within their precincts. I renewed acquaintance with its director, Professor R. H. Compton, who showed me some of the beauties of the gardens. In the afternoon I was much interested to visit the Bolus Herbarium, which has been built on the slope near the upper contour of the road to Constantia Nek. Although commanding a magnificent view



Myrica quercifolia Linn. (MYRICACEAE), widely spread from the Cape into Tropical Africa.

A, male flowering shoot; B, male inflorescence; C, female flower; D, fruit; E, male flower; F, leaf.



Struthiola erecta Linn. (THYMELAEACEAE), from the Cape Peninsula.

over the gardens and of Table Mountain, the atmospheric conditions at this spot are detrimental to the herbarium specimens during the damp winter weather, and it seemed imperative that steps should be taken for the installation of a permanent heating apparatus¹ to counteract the effects of the damp and render the building more comfortable during cold, wet weather. For the weather at Kirstenbosch in winter may sometimes be very cold indeed.

The Bolus Herbarium contains the collections of the late Dr. Harry

¹ Heating apparatus was later put in, but still the atmospheric conditions proved to be unsuitable, and the collection has now been transferred to the University of Cape Town (see *Kew Bulletin*, 1938 : 470).

Bolus, who on retirement from a business life devoted practically his whole time to botany. He travelled extensively in South Africa, and brought together a splendid collection of specimens and books. Many of his duplicates are in the Kew Herbarium, with which he always worked in close co-operation.

In addition to forming this valuable herbarium—at the time of my visit perhaps the finest in South Africa—Bolus contributed to botanical journals, and in collaboration with the late Dr. Guthrie worked out the large and exceedingly difficult family ERICACEAE for the *Flora Capensis*. Another valuable work is his *List of the Flowering Plants and Ferns of the Cape Peninsula* (1903), published in association with Colonel Wolley-Dod. Bolus' *Floral Regions of South Africa* is a contribution to phytogeographical botany well known to plant geographers, and on



[Photogr. : I. B. Pole Evans.

Euphorbia caput-medusae Linn. (EUPHORBIACEAE), a striking plant-form on Signal Hill, Cape Peninsula.

broad lines his division of the flora into seven units has not been seriously modified by any subsequent author.

The Herbarium was left by Bolus at his death to the University of Cape Town, with sufficient funds for its continuation as an active force in the botanical life of South Africa, especially of the Western and South-Western Floral Regions. Soon after the establishment of the National Botanical Gardens at Kirstenbosch it was removed from the University to a special building erected to house the collection near the gardens, with which it has worked in close co-operation. Dr. Bolus' niece and posthumous daughter-in-law, Mrs. L. Bolus (née Miss Louisa Kensit), under the terms of the will, was appointed Curator of the Herbarium. Soon afterwards Mr. N. S. Pillans joined the staff, to which had been added Miss Barnes, and at the time of my visit there were two lady technical assistants and a lady artist.

Mrs. Bolus has been exceedingly active since the death of her uncle,

and is worthily carrying on the work initiated by her relative. She has been largely instrumental in establishing the Wild Flower Protection Society and has written much of the literature connected therewith. Of late years she has devoted a great deal of her time to the study of the genus *Mesembryanthemum*, in a broad sense, which looms so large on the South African Veld, and she is the South African authority on that



Professor R. H. Compton, Director of the Kirstenbosch Botanic Gardens.

Taken during a botanising excursion with the author among the sand dunes at Blaauwberg Strand, Table Bay.

genus and its segregates. She has the advantage of being able to examine living material grown at the botanic garden, which is very necessary in the case of genera with so many fugitive characters. These interesting plants have become deservedly popular with South African horticulturists, who have at their back door, so to speak, an unparalleled wealth of species with which to adorn their rockeries and borders.

The Botanic Gardens, as already mentioned, have a unique setting, with a very equable climate. Frost is unknown, there is a considerable variety of soil and a great quantity of the original vegetation, whilst the scenery in and around the gardens is of surpassing beauty and grandeur. Would that the funds available for development were in equal proportion !

I visited the resting-place of the late Professor H. H. W. Pearson,¹ who was the first director and the moving spirit in the establishment of the gardens in 1913. Up to that time there existed at Cape Town only the municipal gardens in the centre of the city, besides a private garden—that of Mr. H. M. Arderne at Claremont, which contained a



[Photogr. : I. B. Pole Evans, Dec. 1934.]

A sand-binding grass, *Eragrostis cyperoides* Beauv. (GRAMINEAE), on dunes at Blaauwberg Strand, Table Bay.

fine collection of plants, including many exotic trees. But most of the plants grown were, as usual, exotics. About the same time as the establishment of the gardens there came into existence the Botanical Society of South Africa, and the two have worked hand in hand ever since. In fact the gardens owe much of their present prosperity to grants received from the funds of the Botanical Society, which has also used its influence to obtain Government assistance. The objects of the Society are set out in the Society's *Journal* as follows :—

(a) To encourage the inhabitants of South Africa to take an active part in the progress and development of the National Botanic Gardens at Kirstenbosch, a part of the Groote Schuur Estate, in the Cape Province, and to induce them to appreciate their responsibilities therein.

(b) To augment the Government grants towards developing, improving, and maintaining fully equipped botanical gardens, laboratories, experimental gardens, etc., at Kirstenbosch.

¹ For an obituary of Pearson see A. C. Seward, "H. H. W. Pearson", in *Annals Bolus Herbarium*, 2 : 131–147, with portrait and list of his papers.

(c) To organise shows at which may be displayed the results of botanical experiments or cultural skill in improving the different varieties of the South African flora.

(d) To enlighten and instruct the members on botanical subjects by means of meetings, lectures, and conferences, and by the distribution of literature.

At the time of writing the present book I had the Annual Report of the Society for 1938 before me. At that date the number of members was very nearly 2000,¹ showing clearly that the Society meets a real need in the midst of a European population little greater than twice that of Manchester,² and scattered over the vast area stretching from the Limpopo to Cape Point.

From the same Report it may also be learned that the Society is doing all in its power to secure the further protection of wild flowers and the creation of Nature Reserves, not only for the sake of preserving the indigenous flora, but also for its value in the conservation of water, the prevention of soil erosion, and maintaining the natural scenic beauty of the country.

It should be noted also that the Succulent Garden at Kirstenbosch is entirely financed from the Life Members' Fund of the Society, the Life Members numbering 85 (1938). This part of the gardens is of particular value to local members as an object lesson of what may be accomplished with succulents in a winter-rainfall area, wherein very few are naturally at home.

In the year 1936 the twenty-second part of the Society's *Journal* was published, and contains a number of interesting articles, including an illustrated account of the new South African Succulent House at Kew. The Society's *Journal* contains several papers of great interest to the visiting botanist, who will be struck by the wealth of the native flora in and around the botanic gardens. The plant that appealed to me most on my first visit in August was the beautiful mauve-pink *Podalyria calyptrata* Willd. (PAPILIONACEAE), which is abundant in the woods. Below is a list³ of the more important papers, arranged in chronological sequence.

¹ Actually 1971.

² The number of persons of European descent, *i.e.*, white people, in South Africa in 1926 was 1,676,660, and there has been very little increase since then.

³ L. Bolus, "Native Trees and Tree-Shrubs of Kirstenbosch", *Journ. Bot. Soc. S. Afr.*, pt. 3, 12-22 (1917) (contains key and two plates of leaves); this is reprinted in pt. 9, 7-11 (1923).

M. Beghin, L. Bolus, and V. Halm, "Notes on Kirstenbosch LEGUMINOSAE", *Journ. Bot. Soc. S. Afr.*, pt. 5, 17-19 (1919) (key to genera, with 1 plate).

A. R. E. Walker, "Geology of Kirstenbosch", *Journ. Bot. Soc. S. Afr.*, pt. 7, 5-10 (1921).

L. Bolus, "South African GERANIACEAE", *Journ. Bot. Soc. S. Afr.*, pt. 8, 4-7 (1922) (contains key to Cape Peninsula Species).

R. H. Compton, "The Ferns of Kirstenbosch", *Journ. Bot. Soc. S. Afr.*, pt. 10, 19-26 (1924) (contains key and enumeration).

R. H. Compton, "Heaths of the Cape Peninsula", *Journ. Bot. Soc. S. Afr.*, pt. 11, 10-16 (1925) (includes a key to species for use in the field).

R. S. Adamson, "Native Vegetation of Kirstenbosch", *Journ. Bot. Soc. S. Afr.*, pt. 11, 19 (1925).

R. S. Adamson, "Vegetation of the South-West Region", *Journ. Bot. Soc. S. Afr.*, pt. 15, 7-12 (1929).

Chapter IV

MY FIRST ASCENT OF TABLE MOUNTAIN

Week-end at Worcester

ON 17th August I made my first ascent of Table Mountain. As a beginning, and because I preferred to go alone, I chose a well-marked route and followed the Old Trolley Track to Wynberg Reservoir above the botanic gardens at Kirstenbosch. I had been longing to climb Table Mountain and see for myself its remarkable flora and wonderful scenery, about which I had read so much. But it is no easy task for a "tenderfoot" fresh from the steamer, and saddled with rather a heavy camera and a plant-press, besides lunch and a water-bottle, to climb a mountain in such a high temperature as prevailed on this August morning! I soon regretted not having engaged a "boy" to take some of the weight off my shoulders, as I had been advised to do. And "pride" had several falls in consequence.

The slopes behind the director's house at Kirstenbosch are covered by a grove of ancient Silver trees, *Leucadendron argenteum* Linn., perhaps the most interesting and ornamental of the South African PROTEACEAE. They are seen at their best in a gentle breeze, when the silvery sheen of the leaves is displayed to great advantage. A peculiarity of the main stem, even of quite old trees, is the persistent leaf-scars, represented by long, horizontal lines arranged in spirals (see photograph). This is a very remarkable feature, and probably very rare in flowering trees. Over 100 years ago Burchell¹ remarked on the very circumscribed area occupied by the "Silver tree". It is confined to the Cape Peninsula, with the exception of a few trees in the mountains near Stellenbosch, and it might now have been almost extinct but for its preservation in the woods in and around the botanic gardens. Climatic and soil conditions seem to determine the extent of its distribution, for the fruits are admirably adapted for wind-dispersal.

The flowers of all species of *Leucadendron* are dioecious, *i.e.*, the males are borne on one tree, the females on another. The males (Fig. A, p. 23) are in globose heads the size of a small apple, and the bracts are inconspicuous, the pistil being rudimentary. The females (Fig. B) are in similar heads, in which the bracts soon become conspicuous, and resembling the scales of a pine-cone. Within each bract the four-parted perianth at length becomes membranous, and the tube splits at the base, but remains contracted at the top (Fig. D). When the fruit is ripe, this dry perianth is lifted from the "cone" by the wind, and in doing so the fruit is pulled out of the "cone" by the enlarged stigma, catching in the contracted top of the perianth, the lobes of which function as a parachute to carry the fruit containing a single seed (Fig. E).²

The first plant to catch my eye among the large boulders on the

¹ Burchell, *Travels*, p. 61 (1822).

² The botanical reader will find a more detailed account of this interesting phenomenon by A. Nestler in Engler, *Bot. Jahrb.*, 16 : 325-329 (1892).

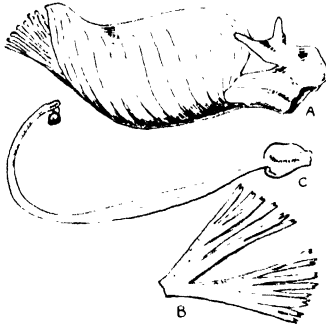


Old and young Silver Trees, *Leucadendron argenteum* Linn. (PROTEACEAE), near Kirstenbosch.



Stem of a Silver Tree, *Leucadendron argenteum* Linn. (PROTEACEAE), showing leaf-scars.

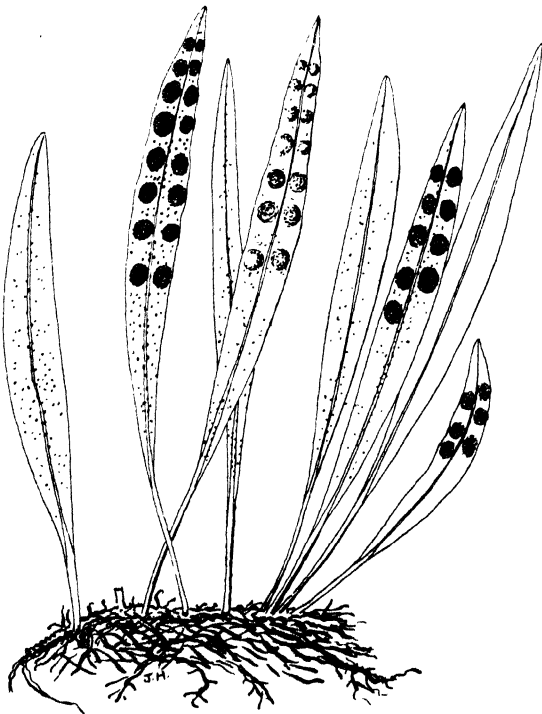
mountain-side was a beautiful *Polygala*, *P. myrtifolia* Linn. (POLYGALACEAE) (No. 12), with large handsome flowers, the wing-petals a deep



Polygala myrtifolia Linn. (POLYGALACEAE), a handsome species on Table Mountain, and widely distributed eastward as far as Tembuland.

mauve, the keel white with mauve tip (see this page). This species is common on the Cape Peninsula, and reappears at Mossel Bay and Knysna and around the Albany Districts as far as Tembuland. An *Ursinia*, *U. dentata* Poir. (COMPOSITAE) (No. 13), with much-divided leaves and bright-yellow flower-heads, was fairly common, and a hoary leaved *Heli-*

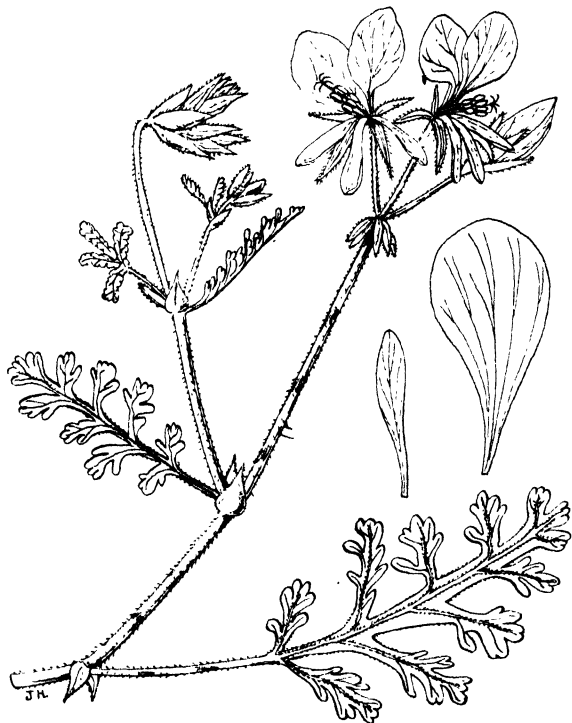
chrysum, *H. odoratissimum* Less. (No. 14), with lemon-yellow bracts. On the rocks in the deep ravine was *Polypodium lanceolatum* Linn.



Polypodium lanceolatum Linn.,
a widely spread species of fern occurring on Table Mountain

(No. 15), the fronds covered below with numerous peltate scales in addition to the large and conspicuous sori (see figure, p. 36). This fern has a wide distribution in the Southern Hemisphere as far as India, but is absent from Australia and New Zealand. Soon I came across a species of *Knowltonia*,¹ *K. vesicatoria* Sims (No. 16), which grew in fairly dense shade in the ravine. I was particularly pleased to see a living member of this most interesting genus of the RANUNCULACEAE, a primitive family² very poorly represented in Southern Africa. It differs from all its relatives in having a baccate fruit, and, like *Clematopsis* (see p. 380), is clearly a derivative from *Anemone*. Out of flower one might easily mistake the plant for an Umbellifer, and no doubt such a resemblance, entirely superficial in this case, led some of the early systematists to suggest affinity between the two families RANUNCULACEAE and UMBELLIFERAE. Growing near was a sedge, *Schoenoxiphium capense* Nees (No. 17).

A little farther up the mountain a beautiful *Pelargonium*, *P. longicaule* Jacq. (*P. myrrhifolium* Ait. var. *longicaule* Harv.) (GERANIACEAE) (No.



Pelargonium longicaule Jacq. (GERANIACEAE); petals pale mauve streaked with red; forms a carpet here and there on Table Mountain.

18), forms a carpet here and there, the pale-mauve petals streaked with red (see this page). This appears to be distinct enough to warrant specific rank. A handsome shrub about 3 ft. high is *Erica baccans*

¹ Named after Thomas Knowlton, formerly Curator of Sherard's famous garden at Eltham.

² A primitive family is one which shows complete absence of cohesion and adhesion in its floral parts. For example, the MAGNOLIACEAE and RANUNCULACEAE are regarded by some (not all) botanists as being the most primitive of the families of flowering plants because their sepals, petals, stamens, and carpels are all free from one another, with the parts of each category arranged in spirals. The spiral arrangement of parts is considered to be the most primitive, being found in the ancient CYCADACEAE and "CONIFERAE".

Knowltonia, the genus mentioned above, although belonging to the primitive family RANUNCULACEAE, is itself rather an advanced genus of the family, the fruit being a berry, which is an adaptation for dispersal by animals, giving the stock an advantage in this respect.

Linn. (ERICACEAE) (No. 19), the calyx and corolla a deep pink, a species apparently endemic in the Cape Peninsula. A second species, *E. hirtiflora* Curt. (No. 20), is even more common, with reddish-pink softly pubescent corollas. I was delighted to find and recognise a species of *Cluytia*, *C. pterogona* Müll. Arg. (No. 21); it carried my thoughts home again to fellow-workers on EUPHORBIACEAE, to Sir David Prain, my late genial director, who took such infinite care with the genus for the *Flora Capensis*, and to Professor Pax, of Breslau. This species is nearly confined to the Cape Peninsula (also in Paarl)

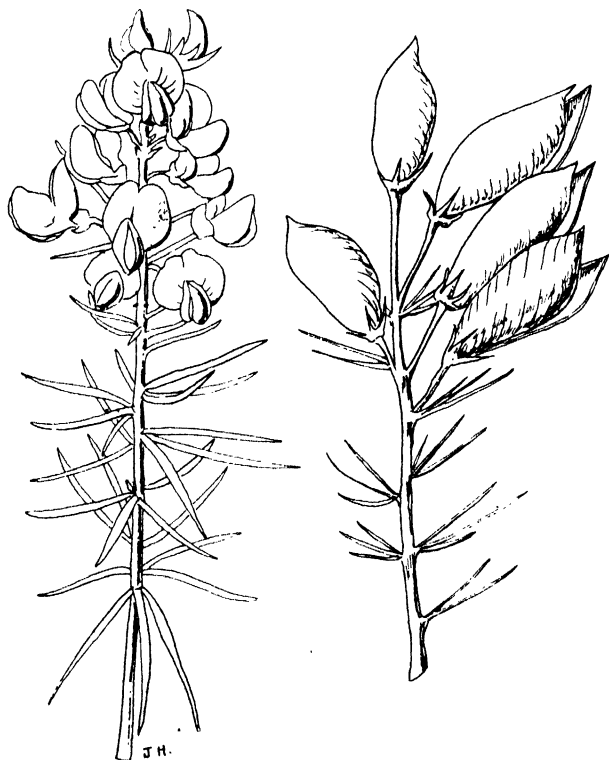


Lobelia pinifolia Linn. (LOBELIACEAE), common in the Cape Region.

A, leaf; B, corolla; C, stamens; D, calyx and pistil.

and is remarkable in having a winged jagged stem. Here also I found fine specimens of a rare *Metalsia*, *M. depressa* Harv. (COMPOSITAE) (No. 22), with white bracts. A *Lobelia*, *L. pinifolia* Linn. (No. 23), grows everywhere, and is quite ornamental (see above). It is shrubby, 2—3 ft. high, with bright-blue flowers like most species of the genus. It grows also at Bains Kloof, and extends eastwards to Riversdale. A tall Restionaceous plant, 3—4 ft. high, reminded me of the exhibition of living South African flowers at Wembley, and proved to be *Restio Gaudichaudianus* Kunth. (No. 24). Associated with the last was a sedge, *Ficinia bracteata* Boeck. (Nos. 25 and 37), common, and widely distributed from the Khamiesberg throughout the

South-Western Region to Uitenhage. Here and there were tall lanky stems of a *Struthiola*, *S. lucens* Lam. (No. 26), endemic ¹ in the Peninsula, with small white flowers, whilst a smaller plant which might easily be mistaken for the same genus was *Agathelpis dubia* (Linn.) Hutch. (No. 27). This was comparatively rare, and later it gave me some trouble to name, so closely does it resemble some genera of SCROPHULARIACEAE, in which the bracts are adnate to the pedicel or calyx, as in *Agathelpis*. It belongs, however, to the smaller family



Cyclopia genistoides R. Br. (PAPILIONACEAE),
flowers yellow, sweet-scented; from Table Mountain.

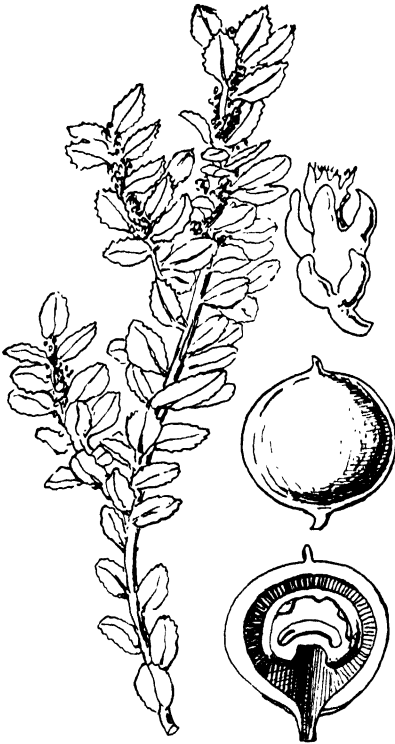
SÉLAGINACEAE, which has no doubt been derived from the same stock as the larger family. Both are richly represented in Southern Africa.

In picking shoots of the family THYMELAEACEAE by hand I noticed a peculiarity: a long strip of bark peeled off and always clung with great tenacity to the parent plant, as if loth to become a herbarium specimen and achieve immortality!

Climbing higher and higher, I found a beautiful Rutaceous herb by the side of the pathway, *Adenandra uniflora* (Linn.) Willd. (No. 28), with pinkish-white petals divided by a crimson midrib. A striking plant in the undergrowth at about 1000 ft. above the botanic gardens was *Cyclopia genistoides* R. Br. (No. 29), with yellow, sweet-scented flowers (see above). The South-Western Region is remarkable for the

¹ The record from Port Elizabeth in the *Flora Capensis* is erroneous.

wealth of genera of the most primitive tribe of the family PAPILIONACEAE, the PODALYRIEAE, primitive in that the stamens are free from each other and not united into bundles, as in most of the rest of the group. In consequence, South Africa might very well lay claim to having been the birthplace of at least a part of this wonderfully successful family of plants. An associated primitive character (at any rate for this phylum) is the *woody habit*. A tall shrub, *Penaea*



Myrsine africana Linn. (MYRSINACEAE), widely spread from Table Mountain to Abyssinia.



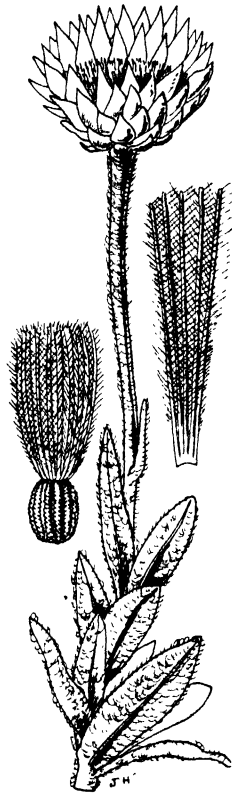
Elegia juncea Linn. f. (RESTIONACEAE), from Table Mountain.

mucronata Linn. (PENAEACEAE) (Nos. 30, 65) grew alongside very similar species of *ERICA*, and was at first sight easily mistaken for such. The tropical mountain-flora was well represented by *Myrsine africana* Linn. (No. 31), which extends from here right away northwards to Abyssinia. The small, densely clustered red flowers were common everywhere (see above). A second species of *Cluytia*, *C. alaternoides* Linn. (No. 32), grew here, a leggy shrub with pale-cream flowers. A low-growing *Phyllica*, *P. imberbis* Berg. (RHAMNACEAE), arrested the attention, as it mimics closely certain *RUTACEAE*. A great difficulty the student of South African botany has to contend with is the close resemblance in growth-form of plants belonging to widely separated families. A tall Restionaceous plant, *Elegia juncea* Linn. (No. 34),

provides an ornament here and there, with clusters of rich brown flowers among large brown papery bracts on rod-like leafless stems (see figure, p. 40). In the South-Western Region the RESTIONACEAE quite usurp the grasses in the landscape, and impart to it here and there a peculiar colour. Scrambling up the rocks, I had my face lashed by a tall lanky species of *Thesium*, *T. strictum* Berg. (SANTALACEAE) (No. 35), perhaps Nature's way of retaliating for the many errors I may have

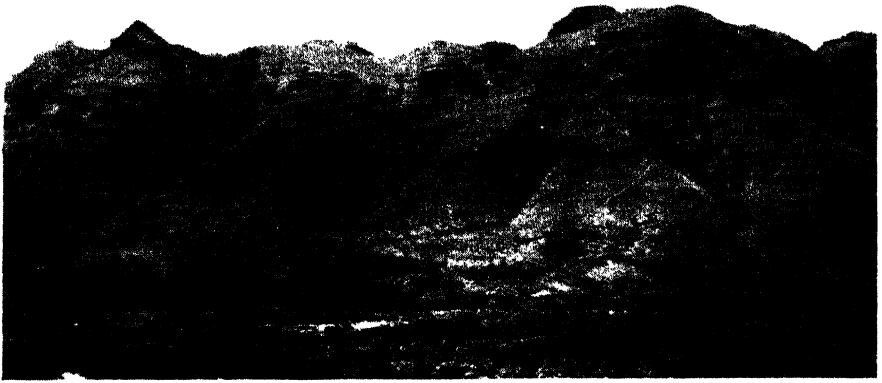


Erica Plukenetii Linn. (ERICACEAE), calyx and corolla dilute red; from Table Mountain.



Helipterum speciosissimum (Linn.) DC, bracts pale straw-coloured; on Table Mountain.

made in naming specimens of this difficult group of plants. Here and there were a few examples of a small Scrophulariaceous herb whose flowers open only in the evening. It has rather a bizarre name, *Zaluzianskya maritima* Walp. (No. 39), in honour of a Pole, Adam Zaluziansky von Zaluzian, and is widely spread from the Cape to the Eastern Transvaal, according to the *Flora Capensis*. The corolla-limb is white inside, carmine outside. Some of the species of this genus are among the most beautiful annuals of South Africa, in favourable seasons towards Darling, for example, forming sheets of colour in the landscape. A tall straggling herb, *Hebenstreitia dentata* L.



(Photogr. : J. B. Pole Evans.

Forest remnants on the back of the Twelve Apostles, Table Mountain, Cape.

(SELAGINACEAE) (No. 43), much resembling wild mignonette, was here and there in evidence.

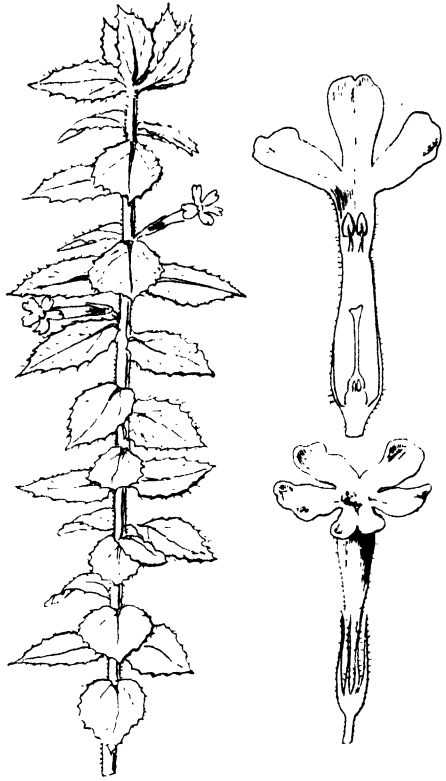
Having now filled my press,¹ I had to postpone the continuation of the climb until a few days later (21st August), when I again started to collect at the point I had left off. Two fine *Ericas* were gathered, very different from each other, the one, *Erica Plukenetii* Linn. (ERICACEAE) (No. 50), a shrub 2½ ft. high, with long pendulous flowers, the calyx and corolla dilute red and very long-exserted anthers (see figure, p. 41), the other, *E. imbricata* Linn. (No. 51), about the same height, but with myriads of small pendulous flowers, the calyx and corolla white, and small brown anthers. A most striking plant to the visitor was *Helipterum speciosissimum* (Linn.) DC. (COMPOSITAE) (No. 52), with large, woolly leaves and pale-straw-coloured bracts (see figure, p. 41.). *Helipterum* is separated from *Helichrysum* only by the fact that the pappus is *plumose* and not merely *barbellate*, an artificial distinction which may one day be dispensed with, for the various species of *Helipterum*, some of which are of great beauty, have close affinities among *Helichrysum*.

Below the crags occurred fine plants of *Oftia africana* Bocq. (No. 53) with small white tubular corollas (see figure, p. 43). *Oftia* belongs to the small family MYOPORACEAE, a close relation of the SCROPHULARIACEAE. The family is distributed mainly in the Southern Hemisphere, *Oftia* being endemic in South Africa (see map). *O. africana* occurs from Vanrhynsdorp to Riversdale, bordering on the Karoo at Karoo Poort, and it has now been collected in the Uniondale Division by Dr. Fourcade. A second species, *O. revoluta* Bocq., with remarkably revolute wavy-margined hairy leaves, occurs on the Khamiesberg and as far

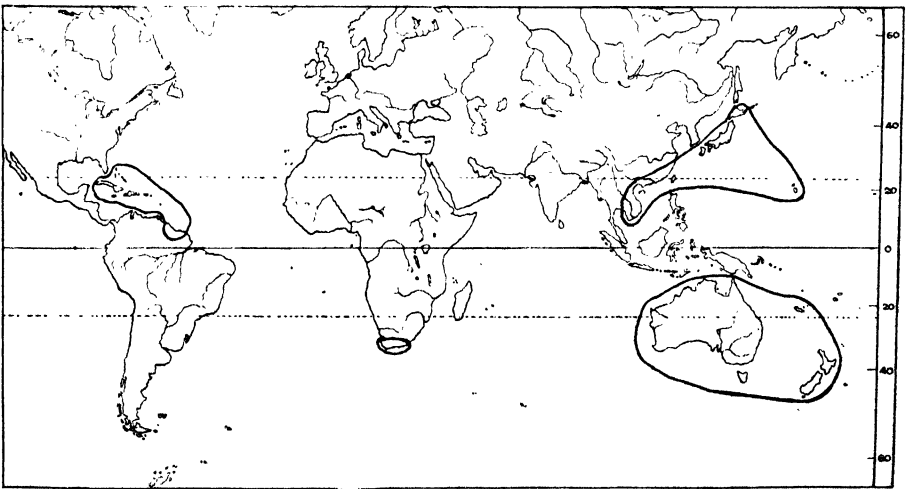
¹ My other numbers collected in the ascent were : Nos. 36, 58, *Erica curviflora* Linn.; 37, 66, *Ficinia bracteata* Boeck; 38, *Protea incompta* R.Br.; 40, *Diosma succulenta* Berg. (RUTACEAE); 41, *Diosma oppositifolia* Linn.

north as Ookiep in Namaqualand. A few years ago Professor Compton discovered a third species, *O. glabra* Compt., on the Witteberg, an "island" of the Cape Flora in the Karoo near Matjesfontein (see p. 62).

I found only one example of a lovely Papilionaceous plant with glabrous 5-parallel-nerved simple leaves and a capitate inflorescence of large yellow flowers, *Liparia sphaerica* Linn. (No. 54), a remarkable species endemic in the Peninsula. A peculiar twiner, with petals mottled with black on the throat, *Cyphia volubilis* (Thunb.) Willd. (CAMPANULACEAE) (No. 55), was clinging to a bush of *Elytropappus* (COMPOSITAE). This sight would no doubt have delighted the eye of my friend Professor James Small of Belfast, who finds the origin of COMPOSITAE in CAMPANULACEAE. Even more so had the prop been a *Senecio*: then according to him it would have been an offspring supporting its ancestor!

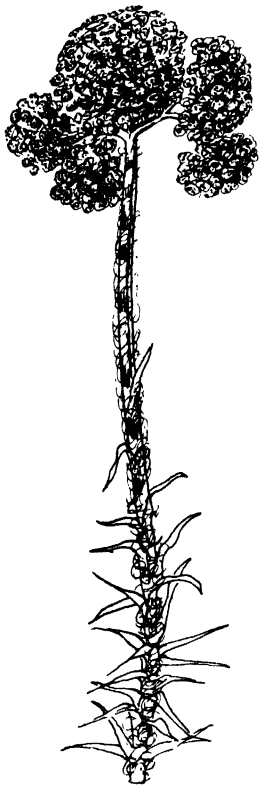


Oftia africana Bocq. (MYOPORACEAE), flowers white; from Table Mountain.



Range of *Myoporaceae*, a small family of flowering plants most numerous in Australia; one endemic genus, *Oftia*, of three species, in South Africa (see p. 42).

A beautiful Composite, *Anaxeton arborescens* (Linn.) Cass. (Nos. 57 and 60), with compact corymbs of white flowers and pink outer bracts, occurred more abundantly towards the top (see below). This might be mistaken for a *Helichrysum*, but is more woody, and the flowers in the middle of the head are male and there are only one or two female. Beyond the hut on the top of the ridge I collected a few plants of various species near



Anaxeton arborescens
(Linn.) Cass. (COM-
POSITAE, from Table
Mountain.



Euryops abrotanifolius DC. (COMPOSITAE), with
yellow flower-heads; from Table Mountain.

the reservoir. From there in the direction of Cape Town is a swampy valley almost filled with a Composite, *Osmitopsis asteriscoides* (L.) Cass., forming a veritable small forest, and one of the few social species observed on the mountain. By the brook was a very large herbaceous species of *Senecio*, *S. rigidus* Linn. (COMPOSITAE) (No. 59), averaging about 6 ft. in height and with large panicles of small yellow-flowered heads, whilst *Euryops abrotanifolius* DC. (COMPOSITAE)

(No. 61), a low straggly shrub with yellow flower-heads (see figure, p. 44), grew near the top of the ridge in company with a beautiful Papilionaceous shrub about $4\frac{1}{2}$ ft. high, with silvery leaves, *Priestleya villosa* DC. (No. 63), a miniature Silver tree (see below). Nearby I was delighted to find specimens of a most interesting group of plants, *Stilbe vestita* Berg. (No. 62), with ericoid leaves and dense spikes of small white flowers. Hitherto these plants have been usually assigned to the family VERBENACEAE, but now that I have studied their structure and geo-



Priestleya villosa DC. (PAPILIONACEAE); a miniature Silver-tree on Table Mountain.

A, flower; B, vexillum; C, wing petal; D, keel petal; E, stamens; F, pistil.

graphical distribution I am sure that Lindley and De Candolle and a few others were nearer the mark in treating the group as a distinct family. Moreover, it is found only in the Cape floral region of Southern Africa, which is noted for its peculiar flora. In addition, there is a parallel group in Australia which should also be removed from VERBENACEAE as a distinct family. True VERBENACEAE, except for weeds of cultivation, are absent from the Cape area.

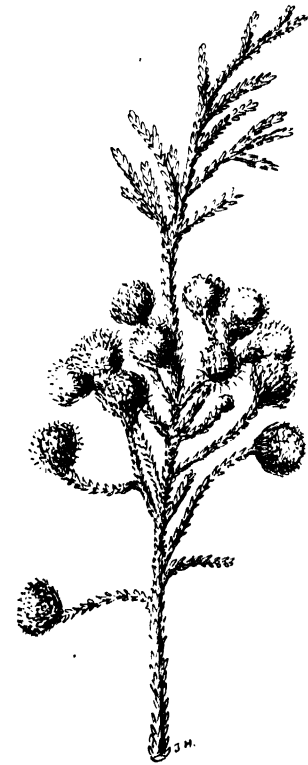
Well satisfied with my day's collecting,¹ I turned my back on this

¹ Also gathered this day: No. 42, *Phyllica imberbis* Berg. (RHAMNACEAE);

paradise for botanists and descended quietly, enjoying the magnificent view across the Cape Flats, the wide stretch of False Bay, deceptive as ever, but now calm and peaceful, with the snow-capped mountains beyond a scene of unsurpassed beauty. The reader may gain some idea of this marvellous panorama from the late Miss M. Page's sketch, published in the *Journal of the Botanical Society of South Africa*, pt. 5 (1919).

Except for a short excursion to Orange Kloof¹ with Mrs. Bolus in somewhat inclement weather, I did not again botanise on Table Mountain until my return to Cape Town in the autumn, for I wished to see as much as possible of the country in general during my tour, and not confine myself exclusively to any particular area.

A few days were now spent in visits to the Botanic Gardens at Kirstenbosch and the Bolus Herbarium. Mrs. Bolus, Professor Compton, and Mr. N. S. Pillans were most helpful in advising and arranging a preliminary programme for me whilst on the Peninsula. Bad weather unfortunately prevented a Sunday's excursion to Lion's Head with Dr. Marloth, but I was gratified to learn from him that Dr. Pole Evans, the Chief of the Division of Botany, had most kindly arranged for me to have the use of a Government car. A condition made was that a member of the botanical survey or his nominee should accompany me on my collecting trips, a provision that worked very happily during the whole of my visit. Later, however, I was able to travel more economically by acquiring the use of a private light Citroën car instead of the heavy Hupmobile lent by the Government. In addition, the Director of the Botanical Survey kindly



Brunia nodiflora Linn. f.
(BRUNIACEAE); from
Orange Kloof.

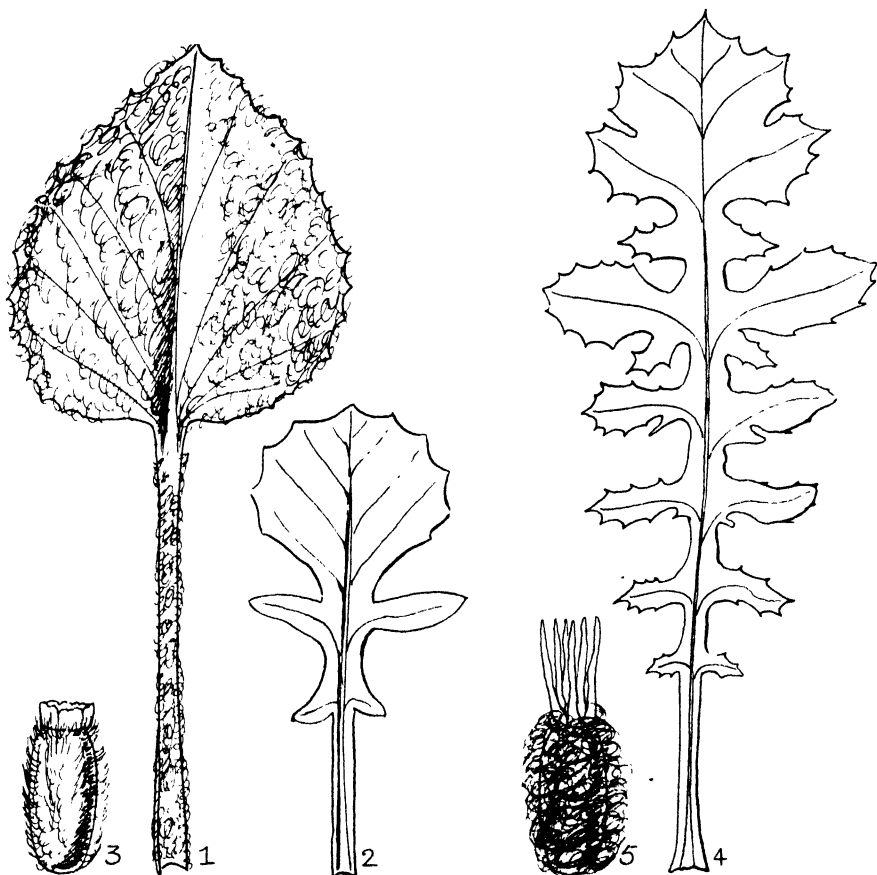
supplied me with warrants for any necessary railway journeys. Of this privilege, however, I made very little use, as the flora of the country is better explored by road, where one can stop at will and collect immediately into the plant presses.

44, *Cyphia bulbosa* (Linn.) Berg. (CAMPANULACEAE); 45, *Rhus rosmarinifolia* Vahl (ANACARDIACEAE); 56, *Serruria Burmannii* R. Br. (PROTEACEAE); 61, *Ficinia bracteata* Boeck. (CYPERACEAE) (near Claremont); 64, *Polygala bracteolata* Linn. (POLYGALACEAE).

¹ The following plants were collected at Orange Kloof on 19th August: No. 46, *Lobostemon glaucophyllus* Buek (BORAGINACEAE); 47, *Brunia nodiflora* Linn. f. (BRUNIACEAE); 48, *Gnidia pinifolia* Linn. (THYMELAEACEAE); 49, *Oemitopsis asteriscoides* (Linn.) Cass. (COMPOSITAE).

Botanising at Fish Hoek

On Wednesday, 22nd August, accompanied by Mr. N. S. Pillans, I took the train from Claremont to Fish Hoek. Just outside Fish Hoek station we examined lovely patches of *Microstephium populifolium* (Berg.) Druce (*M. niveum* Less.) (COMPOSITÆ) (No. 95), which occurs on sandy beaches near the sea all the way from here to Natal. It is a beautiful species, with pale-yellow ray-flowers green below and hoary



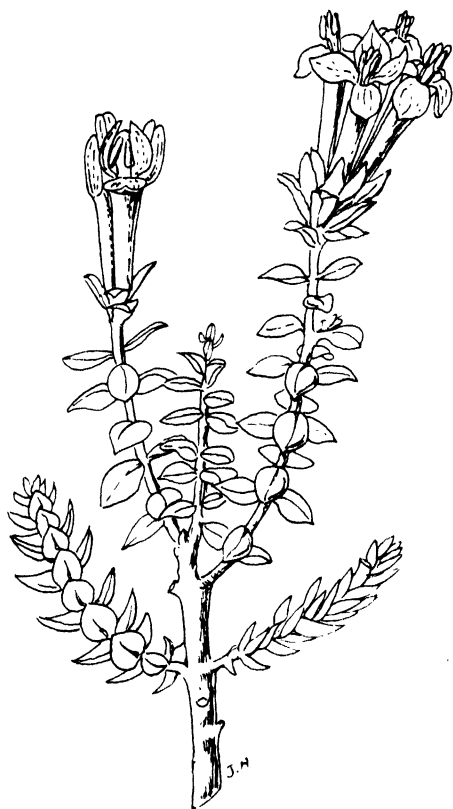
1-3, *Microstephium populifolium* (Berg.) Druce (COMPOSITÆ); 4-5, *Cryptostemma Calendula* (Linn.) Druce; two species of different genera easily confused.

leaves. The same species was also observed in the blown sand at the top of the ridges, a rather unusual place for it so far from the sea.

This *Microstephium* proved a very difficult species to dry in the plant-press, and apparently should have special treatment, as so many maritime plants need. As there seems to be confusion in herbaria between this species and *Cryptostemma Calendula* (L.) Druce, I append ¹ a short diagnosis of each with a figure of typical leaves and achenes.

¹ ***Microstephium populifolium* (Berg.) Druce.** Leaves usually undivided, with a broadly ovate-rounded blade at the end of a long entire, but sometimes a

We ascended the rocky face of the hill above the station, and found a large number of interesting plants on the mountains between this place and Simonstown, which was reached in the evening, after an arduous day. In dry situations on the tops of the hills we were fortunate to find two beautiful species of *Sarcocolla* of the family PENAEACEAE, another of South Africa's small endemic families, differing from



Sarcocolla tetragona (Berg.) Salter, belonging to the endemic family PENAEACEAE.

the THYMELAEACEAE particularly in the valvate calyx-lobes (they are imbricate in THYMELAEACEAE). The calyx is brightly coloured and tube-like in *Sarcocolla*, and the difference between the two species collected was not very great, *S. tetragona* (Berg.) Salter (*S. squamosa* Endl.) (No. 67) having larger leaves and finer flowers than *S. minor* Zeyh. (No. 68). The family PENAEACEAE, on account of the valvate calyx, is therefore a more recent evolution from the THYMELAEACEAE and has been developed only in South Africa, having no counterpart in Australia, as is usually the case.

Bentham and Hooker could suggest no particular affinity with any other family, whilst Lindley, on account of the position of the stamens opposite to the place where the petals would be if they were present, considered it to be near RHAMNACEAE. Too much attention was given to *floral diagrams* in those days, and this subsequently often led to the suggestion of improbable affinities and unsatisfactory classification. Excluding *Geissoloma*, which is now treated as a separate family, there

are five genera of PENAEACEAE, all endemic in the South-Western Region of South Africa. On the mountain-sides¹ we gathered speci-

little lyrate lobed petiole, at first densely woolly on both surfaces, the wool on the upper surface soon falling off and leaving it densely setulose-papillous; involucre densely white-woolly outside; achenes tomentose, with a very short cup-like slightly lobed crenulate pappus.—On primary sand beaches close to the sea, from the Cape Peninsula to Natal.

Cryptostemma Calendula (L.) Druce. Leaves variously lyrate pinnatifid, at first thinly setulose but not woolly above, white-woolly-tomentose below, the base of the petiole with a foliaceous auricle; involucre bracts woolly only at the tips; achenes very densely woolly with nearly equally long linear pappus-scales.—Mostly on sand-dunes and by the wayside and more inland than the preceding.

¹ Other plants collected: No. 69, *Gnidia juniperifolia* Lam. (THYMEL-

mens of a very remarkable *Salvia*, *S. aurea* Linn. (LABIATAE) (No. 71), with dull golden-yellow corollas, providing a weird contrast with the silvery leaves. This species has a range from Clanwilliam to Bathurst. Next came a member of the endemic family BRUNIACEAE, *Staavia radiata* (Linn.) Dahl (No. 70), almost exactly mimicking several species of *Phyllica* and many RUTACEAE. From both these groups, however, it may be distinguished by the semi-inferior ovary and the stamens alternating with the petals. Should a student be puzzled about any of these families, the following characters may settle his doubts:—

Stamens as many as the petals, and alternate with them or double the number; ovary superior; leaves glandular.....RUTACEAE
 Stamens as many as the petals and opposite to them; ovary inferior; leaves not glandular.....PHYLLICA
 Stamens as many as the petals and alternate with them; ovary at most semi-inferior; leaves not glandular.....BRUNIACEAE

This little *Staavia* has acicular or ericoid leaves which are rather peculiar in being distinctly stalked, the blade disarticulating at the top of the stalk and leaving the latter as a persistent "peg". The tip of the leaf is also curious, being a little black point. The involucre around the head is formed by the upper pale-coloured leaves.

A small Papilionaceous shrub next engaged our attention; it has beautiful mauve flowers with a deep-purple keel, and proved to be *Amphithalea incurvifolia* E. & Z. (No. 75), a species endemic in the Peninsula. It was described originally from the neighbouring Muizenberg, and was referred in the *Flora Capensis* to *A. ericifolia* E. & Z., which differs, however, in its leaves being glabrous on the upper surface, and the more capitate flowers. The genus *Amphithalea* contains such beautiful shrubs that I give below ¹ a résumé of the distribution of the species with their correct names according to International Rules.

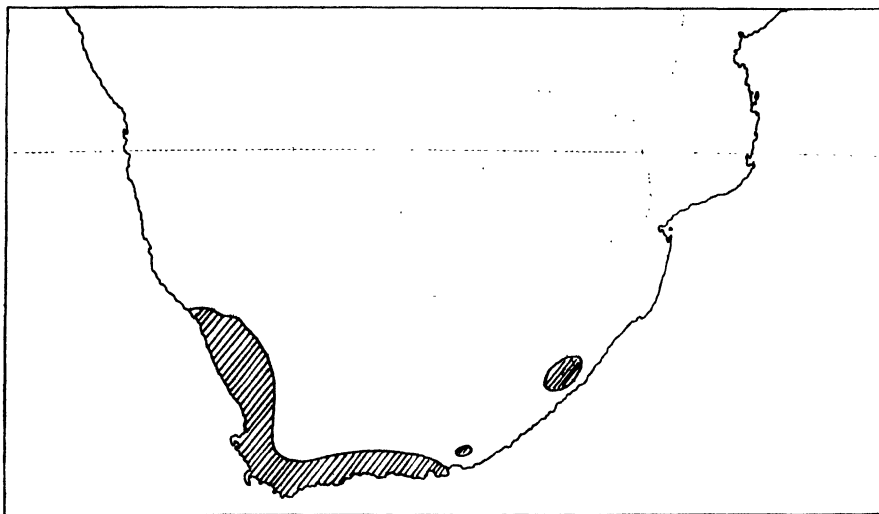
We were most fortunate to find here a very rare Peninsula plant, *Adenandra ciliata* Sond. (RUTACEAE) (No. 78), a species collected only by von Ludwig on the neighbouring Muizenberg. Another surprise also awaited us in our No. 77, of which only one plant was found. This, after a good deal of search and investigation, proved to be *Audouinia capitata* Brongn., of the family BRUNIACEAE, a monotypic genus found only on the Cape Peninsula and at Hanglip on the opposite shore of Simons Bay. In appearance it resembles some species of *Erica* and of

AEACEAE); 72, *Muraltia demissa* W. Dod (POLYGALACEAE) (endemic in the Peninsula); 73, *Struthiola erecta* Linn. (THYMELAEACEAE); 74, *Indigofera angustifolia* Linn. (PAPILIONACEAE); 76, *Zygophyllum spinosum* Linn. (ZYGO-PHYLLACEAE); 79, *Petalacte coronata* (Linn.) Don (COMPOSITAE).

¹ 1. *Amphithalea cuneifolia* E. & Z.—Hottentot's Holland Mts. and Houw Hoek Mts.; Helderberg. 2. *A. imbricata* (Linn.) Druce (*A. Bodkinii* Dummer)—Table Mtn.; Nord Hoek Mtns. to Humansdorp. 3. *A. violacea* Benth.—Swellendam to George. 4. *A. intermedia* E. & Z.—Palmiet River to George. 5. *A. ericifolia* E. & Z.—Cape Peninsula to Bredasdorp. 6. *A. incurvifolia* E. & Z.—Mtns. from Muizenberg to Smitwinkel Bay. 7. *A. densiflora* E. & Z.—Cape Flats at foot of Table Mtn. to Tygerberg. 8. *A. virgata* E. & Z.—Caledon Div. 9. *A. phyllicoides* E. & Z.—Vanstaadensberg to Albany. 10. *A. Williamsonii* Harv.—Grassy hills near Grahamstown. 11. *A. micrantha* Walp.—Uniondale and Vanstaadensberg. 12. *A. sericea* Schltr. and 13. *A. speciosa* Schltr.—Bredasdorp Div. 14. *A. villosa* Schltr.—Cold Bokkeveld, Ceres Div. and ? Ceder Bergen.

certain RUTACEAE, being a small shrub with imbricate linear leaves, with crimson flowers crowded in oblong to globose spikes or heads, a rather primitive genus of the family, because the majority of the other members have the flowers crowded into compact heads.

A few notes on the BRUNIACEAE may be of interest. The family is endemic in South Africa and is very nearly confined to the Cape Region (see map). On the west side it is represented as far north as the Oliphants river mountains in Clanwilliam, its maximum development is in Caledon (eleven genera and twenty-five species), and it extends eastwards as far as Pondoland and Natal (one species of *Raspalia*). With the exception of the latter and of *Berzelia intermedia* Schlechter, which extends to Howieson's Poort in the Albany Division, the family is confined to the Cape Region.



Range of the endemic family BRUNIACEAE; its distribution seems to be determined by the occurrence of the Table Mountain Sandstone formation, detached portions of which occur in Albany, Pondoland, and Natal.

On the Cape Peninsula eleven species occur, representing five genera. On Table Mountain *Berzelia lanuginosa* Brogn. forms dense impenetrable thickets, and it is plentiful near streams and in swampy localities on the Cape Peninsula and eastward to Caledon, sometimes forming a conspicuous feature in the landscape. The occurrence of the family is apparently determined by the presence of the Table Mountain Sandstone formation, which ceases just beyond Port Elizabeth, and reappears in Pondoland and southern Natal. It is related to, or may be a parallel development of the family HAMAMELIDACEAE, which occurs mostly in the Northern Hemisphere (see p. 219). Students interested in the family should consult Dümmer's ¹ commendable account.²

¹ R. A. Dümmer, South African born, partly of German origin, a talented young man who would probably have made a great name for himself as a botanist had he had the opportunity. He entered Kew in 1910 as a student gardener, then helped the late Mr. Elwes and Dr. Henry with their work on *British Trees*, and in his spare time worked hard in the Kew Herbarium studying the South African flora. Later he obtained an appointment with a rubber company in Uganda, where he collected extensively. He was killed in a motor accident in Uganda in 1923.

² Dümmer in *Journ. Bot.*, 1912 (Supplement).

Another rare plant collected ¹ was *Aspalathus Forbesii* Harv. (PAPILIONACEAE) (No. 81), recorded previously only from between Retreat Vlei and Muizenberg. This was a small shrub, with fascicles of small leaves and heads of small cream flowers. Another legume endemic in the Peninsula was *Liparia parva* Vogel ex Walp. (No. 82), a small shrublet with simple oblanceolate leaves and balls of cream Papilionaceous flowers surrounded by large purplish ciliate bracts. A *Senecio* growing in very deeply drifted sand on the mountain was *Senecio elegans* Linn. (COMPOSITAE) (No. 83). This is a beautiful



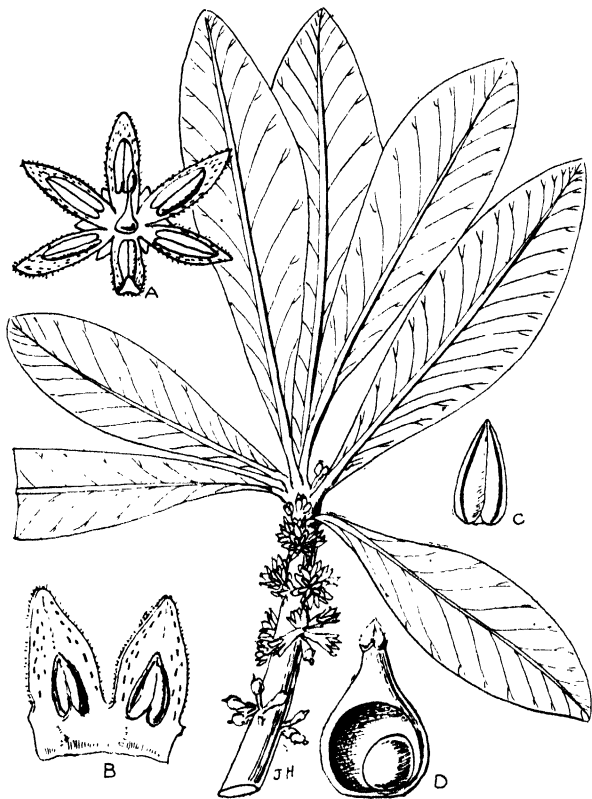
Cotula myriophylloides Harv. (COMPOSITAE), one of the very few aquatic members of the family, occurs in pools on the Cape Peninsula.

A, whorl of leaves; B, outer female flower; C, achene from the same; D, disk flower; E, style arms of same; F, achene of same.

herb 1–1½ ft. high, with pinnately lobed leaves, deep pink ray-flowers, and yellow disk. A small shrub about 2½ ft. high, covered with light blue flowers, was *Lobostemon montanus* Buek. (BORAGINACEAE) (No. 89). A herb in moist ground was *Cotula coronopifolia* Linn. (COMPOSITAE) (No. 91). On the Cape Peninsula there is another and very remarkable

¹ Also collected between Fish Hoek and Simonstown: No. 80, *Sarcocolla tetragona* (Berg.) Salter (PENAEACEAE); 84, *Hypoxis serrata* Linn. f. (HYPOXIDACEAE); 85, *Hermannia salvifolia* Linn. f. (STERCULIACEAE); 86, *Indigofera brachystachya* E. Mey. (PAPILIONACEAE); 87, *Gnidia pinifolia* Linn. (THYMELAEACEAE); 88, *Senecio arniciflorus* DC. (COMPOSITAE); 90, *Struthiola longiflora* Lam. (THYMELAEACEAE); 92, *Cullumia setosa* R. Br. (COMPOSITAE); 93, *Cluytia rubricaulis* var. *grandifolia* Prain (EUPHORBIACEAE); 96, *Hermannia rudis* N.E. Br. (STERCULIACEAE); 148, *Metalasia muricata* Less. (COMPOSITAE); 149, *Passerina paleacea* Wikstr. (THYMELAEACEAE); 150, *Protea scolymocephala* Reichard (PROTEACEAE); 151, *Mimetes cucullata* (Linn.) R. Br. (PROTEACEAE).

species of this genus in *C. myriophylloides* Harv. This was first discovered in pools at Green Point, but probably no longer exists there. Colonel Wolley-Dod found it also in the Commetji Effluent at Chapman's Bay. This species is one of the very few COMPOSITAE which are aquatic, the family being so well equipped to hold its own against its competitors and not easily driven into the water, after the manner of the aquatic RANUNCULACEAE and other older families. A woolly-headed Composite proved to be *Eriocephalus septulifer* DC. (No. 94). Growing



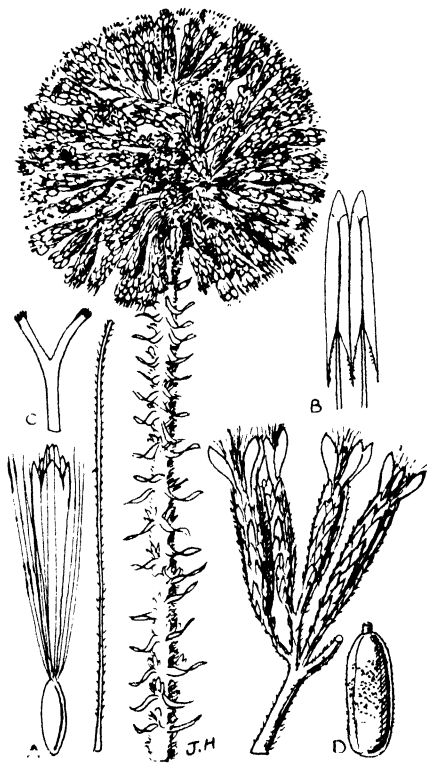
Rapanea melanophleas (Linn.) Mez (MYRSINACEAE),
a tree on the Cape Peninsula.

A, open flower; B, part of corolla, showing the anthers opposite the lobes; C, anther; D, vertical section of ovary.

in damp places and forming almost a carpet was the curious fern, *Schizaea pectinata* Smith (No. 98). I had observed a great quantity of this on Table Mountain. A very striking plant in the blown sand was *Myrica cordifolia* (MYRICACEAE), with roots many yards long, on which occurred here and there bright scarlet plants of the parasite, *Hyobanche sanguinea* Thunb. (SCROPHULARIACEAE) (No. 99). Many of this family are, or tend to be, parasitic, such as the well-known *Striga asiatica* Lour. The same type of semi-parasitism is found even in the British flora, familiar examples being the "Yellow Rattle" (*Rhinanthus*), and *Bartsia*.

Along Chapman's Peak Road

On Thursday, 23rd August, I again met Mr. Pillans, and we botanised together along the Chapman's Peak road, above the shores of Hout Bay.¹ At Hout Bay Nek a conspicuous shrub with dark green ovate leaves was *Phylica buxifolia* Linn. (No. 100). This is found only on the Cape Peninsula and on the Sir Lowry's Pass, so far as our records at Kew show. A small Rutaceous shrublet with strongly scented mauve flowers proved to be a very rare species, *Agathosma cerifolia* B. & W. (No. 101). The family LILIACEAE was represented by a small herb with long lanceolate acuminate leaves appressed to the ground and small green flowers, *Androcymbium leucanthum* Willd. (No. 102). A small grass-like herb with filiform leaves and racemes of small greenish-white flowers proved to belong to the JUNCAGINACEAE, *Triglochin bulbosum* Linn. (No. 104). COMPOSITAE soon claimed our attention. I have always been particularly interested in the family, and especially in the Cape representatives. Growing in a dip below the road was quite an extensive stand of the handsome *Euryops abrotanifolius* DC. (No. 106) (see figure, p. 44), with deeply cut linear leaves and fine heads of yellow flowers. Next came two species of *Osteospermum* *O. ciliatum* Berg. (COMPOSITAE) (No. 107), a weak straggly herb, with the young parts woolly, and *O. moniliferum* Linn. (No. 112), the latter an amazing species both as regards variation, choice of habitat and distribution. Here it is a shrubby Composite, very distinctive, which grows in abundance from sea-level on the Cape Peninsula right around the east coast to as far



Metalsia muricata Less. (COMPOSITAE), a very common species on the sand dunes of the Cape Peninsula and elsewhere.

A, flower and pappus bristle; B, anthers; C, style-arms; D, achene.

¹ Also collected: No. 103, *Stachys aethiopica* Linn. (LABIATAE); 105, *Anthospermum ciliare* Linn. (RUBIACEAE); 108, *Rapanea melanophloeos* (L.) Mez. (MYRSINACEAE); 109, *Arctotis acaulis* Linn. (COMPOSITAE); 110, *Othonna arborescens* Linn. (COMPOSITAE); 111, *Indigofera incana* Thunb. (PAPILIONACEAE); 113, *Doria perfoliata* Thunb. (COMPOSITAE); 114, *Oxalis Pes-Caprae* Linn. (OXALIDACEAE); 116, *Hermannia hyssopifolia* Linn. (STERCULIACEAE); 117, *Indigofera mauritanica* (Linn.) Thunb. (PAPILIONACEAE); 118, *Lotononis umbellata* Benth. (PAPILIONACEAE); 119, *Phylica ericoides* Linn. (RHAMNACEAE); 121a, *Bulbine asphodeloides* Roem. & Schult. (LILIACEAE); 123, *Leucadendron salignum* R. Br. (PROTEACEAE).

north as Usambara in Tanganyika Territory; it climbs to the top of the Khamiesberg and the Karee Bergen in the west, and well up the slopes of the Mont aux Sources on the Drakensberg, where it grows in the sandy beds near the streams. The reason for this great range is no doubt due to the fruit being a juicy berry much sought after by birds. The species attains its fullest development on shale near the coast. On sea-cliffs near Hout Bay we found it quite prostrate or semi-prostrate. A small prickly *Solanum* with very tomentose leaves



N. S. Pillans with a botanical "bag" on the Cape Peninsula.

and deep-mauve flowers proved to be *S. tomentosum* Linn. (SOLANACEAE) (No. 110a), which Bolus and Wolley Dod note as being rare on the Peninsula.

Our No. 115, to my great surprise, proved to be a fine new species of *Muraltia* (POLYGALACEAE), which I have named *M. orbicularis*,¹

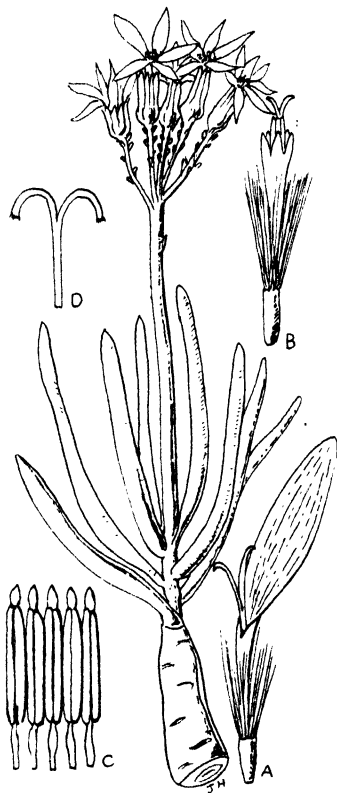
¹ *Muraltia orbicularis* Hutch. sp. nov., foliis orbicularibus vel late ovato-orbicularibus valde distincta.

Fruticulus multe et intricate ramosus; rami vetustiores teretes, circiter 2.5 mm. diametro, puberuli, annotini subdense foliati, breviter pubescentes. Folia orbicularia vel late ovato-orbicularia, apice hamato-apiculata, 7-8 mm. longa, 5-6 mm. lata, crassissima, marginibus minute scabrido-ciliolatis; petioli breves et lati. Flores axillares, solitarii, subsessiles, rosei-coerulei. Sepala subaequalia, elliptica ad ovato-elliptica, subobtusa ad apiculata, usque ad

with reference to its almost orbicular leaves. These have a strongly recurved very short point, which gives the leaf an emarginate appearance. The flowers are sessile and mauve-pink, as in most other species of the genus. I hardly expected to step off the road within a few miles of Kirstenbosch and pick up a new species so readily! We next gathered two more COMPOSITAE, *Oedera prolifera* Linn. f. (No. 120), a small shrublet in open scrub, with closely imbricate, rather prickly leaves and rather showy heads of flowers, the rays yellow above and brownish-red below; *Oithonna dentata* Linn. (No. 121). The common Silver-bush, *Leucadendron salignum* R.Br. (PROTEACEAE), was everywhere, whilst our satisfaction was complete on climbing a rocky ledge to find a species of COMPOSITAE unrecorded for the Peninsula, *Senecio corymbiferus* DC. (No. 122), the nearest point from which it has been collected being the foot of the Matroosberg, in the Worcester Division, and from near Darling. It is a fleshy shrub about 3½ ft. high with thick linear turgid leaves and corymbs of yellow flower-heads with inconspicuous ray-flowers. It represents quite a Namaqualand type of flora, of which there are several on the Peninsula.

Week-end at Worcester

The week-end was occupied by a visit to Worcester by train, accompanied by Mr. Dunsdon, formerly in charge of the floral display at the Wembley Exhibition. There I met a well-known South African artist, Mr. Naudé, and saw his charming garden. On the Saturday afternoon we made an excursion in his motor caravan to the neighbouring Hex River Mountains, where I was excited at meeting with a portion of the Karoo flora for the first time. Mr. Naudé was keenly interested in plants, and in the evening he showed us some beautiful paintings of the Namaqualand scenery and flora, which he had visited in the year 1925, during a very good season. When later I journeyed through some of the same country, then suffering from



Senecio corymbiferus DC. (COMPOSITAE), recorded for the first time from the Cape Peninsula.

A, ray-flower; B, disk-flower; C, stamens; D, style-arms.

2.75 mm. longa. Corolla 7 mm. longa; petala lateralibus oblongo-lanceolata, subacuta, medio pubescentia. Ovarium superne pubescens, apice 4-cornutum.

Cape Peninsula: near Chapman's Peak Road, Hout Bay, small shrub, flowers mauve-pink, 23rd August, 1928, *Hutchinson* 115 (type in Kew Herbarium); same locality, March 1930, *N. S. Pillans* 6284.



The Garden of Remembrance at Worcester; *above*, its designer, Mr. Naudé.

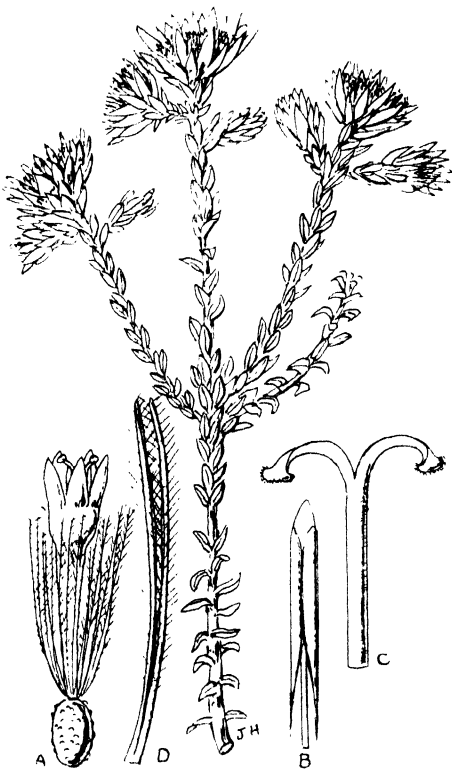
severe drought, it was difficult to believe that it could look so different.

The Garden of Remembrance is situated in the middle of the Commonage at Worcester, and was designed by Mr. Naudé. It is beautifully laid out, and planted almost entirely with South African flowers. At the time of my visit the "Gous-bloom", *Venidium fastuosum* (*V. Wylei*) (COMPOSITAE) from Namaqualand was in full flower and growing to perfection, and also *Aster elongatus* Thunb. (COMPOSITAE) (No. 152)

An afternoon was taken up with botanising around Brand Vlei reservoir, used largely for irrigation purposes, and the most extensive stretch of water in South Africa. We made a small collection of the flora around the lake in the vicinity of the road.

A very strikingly ornamental plant was a beautiful everlasting, *Helipterum canescens* DC. (COMPOSITAE) (No. 124), with silvery-white leaves and lovely pale-pink involucre bracts. My black-and-white sketch fails to give any idea of the charm of this plant, growing as it does in the arid rocky Karoo. A shrubby species of *Aster* (No. 126) with beautiful mauve-blue ray-flowers, after a careful survey of the older allied *A. filifolius* and *A. fruticosus*, has proved to be a new species. It equals *Burchell* 1413, from the Roggeveld; *Schlechter* 7873, from Saron near Tulbagh; *Ryder* 45, from near the Robinson Pass, and *Drege's* plant, from the Sneeuwberg in Graaf Reinet, distributed as "*Diplopappus filifolius* DC. d." Here and there were fine examples of the bright-scarlet *Hycbanche sanguinea* Linn. (No. 131). This wonderful genus of parasites is endemic in South Africa, and contains five species. *H. sanguinea* ranges from Namaqualand to Queenstown.

A herb with solitary leaves and racemes of greenish-white flowers, *Lachenalia unifolia* Jacq. (No. 132), grew among the stones. Under rocks occurred a small herb with suborbicular leaves and greenish-yellow flowers, a rare species of *Crassula*, *C. loriformis* Schönl. ex Bak. f. (CRASSULACEAE) (No. 137). A handsome *Protea* was *P. marginata* Thunb. (PROTEACEAE) (No. 138), indicating the nearness of the true Cape flora.



Helipterum canescens DC. (COMPOSITAE), a beautiful everlasting with pink bracts; from Brandt Vlei, near Worcester.

A, flower; B, stamen; C, style-arms; D, pappus bristles.

During the next few days, 27th–29th August, the weather was very cold and wet, and only short excursions were possible along Chapman's Peak road,¹ where I collected from the Government car around Camps Bay and gathered a few species.²

¹ 125, *Selago triquetra* Linn. f. (SELAGINACEAE); 128, *Sutera fastigiata* (Benth.) Hutch., comb. nov. (SCROPHULARIACEAE); 129, *Eriocephalus umbellatus* DC. (COMPOSITAE); 130, *Heliophila amplexicaulis* L. (CRUCIFERAE); 133, *Hesperantha falcata* (Linn. f.) Ker. (IRIDACEAE); 134, *Lapeyrousia bracteata* (Thunb.) Ker. (IRIDACEAE); 135, *Microlooma sagittatum* R. Br. (ASCLEPIADACEAE); 136, *Doria Lingua* Less. (COMPOSITAE).

² Collected at Camps Bay: No. 139, *Cenia turbinata* Pers. (COMPOSITAE), from Claremont; 140, *Relbunium genistifolia* (Linn.) L'Hérit. (COMPOSITAE); 141, *Salvia aurea* Linn. (LABIATAE); 142, *Rhus lucida* Linn. (ANACARDIACEAE); 143, 149, *Passerina paleacea* Wikstr. (THYMELAEACEAE); 144, *Helichrysum retortum* Thunb. (COMPOSITAE), a useful sandbinder; 145, *Mundtia spinosa* DC. (POLYGALACEAE); 146, *Senecio umbellatus* Linn. (COMPOSITAE); 147, *Pelargonium capitatum* Ait. (GERANIACEAE); some of these species are shown on the accompanying plate.

EXCURSION TO MATJESFONTEIN AND THE KAROO

ON Thursday, the 30th August, I accompanied Professor and Mrs. Compton and Mr. N. S. Pillans on an excursion by car to Matjesfontein, to see the Karoo garden at Whitehill. Our route took us over the Cape Flats to Somerset West and up the picturesque Sir Lowry's Pass, a locality well known by name to European workers on the Cape Flora. I was much struck by the dominance of the family PROTEACEAE in this area, especially by the large expanses of *Leucadendron* seen from the Pass as far as the Karoo at Worcester. At that time of year the mountains and valleys were very beautiful, with many tints of green and yellowish-green. Occasionally there were fairly broad patches of pink *Erica*, but rarely anything resembling Scotch heather seen from a distance.

Although this was the main Cape-to-Cairo road, it was at that time little better than a good single-track farm road in Britain, and sometimes much worse. After the rains the dips, occurring at regular intervals,



Diagrammatic longitudinal section of a Karoo road showing humps at intervals, which prevent the road from becoming a watercourse during storms.

were full of water which swished right over the car when travelling at speed. A peculiarity of the South African roads, especially in the Karoo, are the innumerable humps which are made to check the flood-water from washing away the surface. In a very well-sprung car, at any rate, these humps are something of a nuisance, and often cause the hapless passengers in the back seat to sample the quality of the hood, sometimes to their disadvantage and occasional disfigurement. In such dry-looking regions one can scarcely believe these drainage humps to be necessary until a sudden rainstorm is experienced, when their utility is at once evident, by the water spreading laterally instead of flowing along the road.

We lunched in a *Eucalyptus* grove, a novel experience for me. Various species have been introduced from Australia and grow luxuriantly, and, like many other introduced trees, rather spoil the natural features of the country. At Viljoen's Pass we paused for a while and had a look at the rich flora, but there was no time for collecting, as it was nearly dark when we reached Touw's River, where we stopped for dinner. Afterwards we had a beautiful moonlight drive to Matjesfontein, and arrived at 9.30.

Next morning we met Mr. James Logan, to whom Kirstenbosch is indebted for its 40 acres of ground at Whitehill, a few miles from Matjesfontein, where a botanical reserve for the preservation of Karoo



[Photogr. : I. B. Pole Evans.]

The way plants grow in the arid stony Karoo; *Euphorbia* at the base of bush of *Rhigozum trichotomum* Burch. (BIGNONIACEAE), and with sometimes a vicious little snake; near Aberdeen Road, Cape Province.



[Photogr. : I. B. Pole Evans.]

Euphorbia stellaeaspina Haw. (EUPHORBIACEAE), with shrubs of *Rhigozum obovatum* Burch. (BIGNONIACEAE), near Beaufort West; the monotony of the Karoo is well brought out in this photograph; the road may be discerned trailing into the distance.

plants was established in 1921. Mr. Archer, the Curator, accompanied us on a trip through the neighbouring Karoo. We travelled for mile after mile through a perfectly flat plain, bordered on each side by fairly small kopjes and farther back by high mountains. The Karoo was



An ancient Almond tree in the Karoo.

quite different from anything I had pictured it to be. The dried-up stream-beds often provided the road track.

Plants of the same species rarely grow socially in the Karoo. They mostly grow singly or socially with other species, usually in tiny clumps of three or four species together, with considerable space between, through which one may walk quite comfortably. Each clump consists of a spiny low bush which shelters and protects several other quite

different and often fleshy plants, such as *Senecio* (*Kleinia*), *Pelargonium*, and *Crassula*, and sometimes a snake. I had somehow expected the Karoo to be covered with a large association of *Aloë*, spiny *Euphorbia*, etc., giving the landscape a "cactus-like" appearance. I was to learn later, however, that this was characteristic of the Addo Bush of Uitenhage and Albany in the Eastern Cape, rather than of the Karoo in general.

We lunched at Drie Koppen farm, the owner an interesting old man who struggles to make a living. He claimed to have a tree of the common almond which was mentioned by Livingstone as being "160 miles from the coast". The tree pointed out is certainly very old, about 30 ft. high, with a gnarled bole about $4\frac{1}{2}$ ft. in diameter. It was just breaking into flower.

This was to be a circular drive, and on the return journey at the foot of some cliffs near Petermentjies we collected a tall Composite with a beautiful huge corymb of yellow flower-heads—*Othonna amplexicaulis* var. *denticulata* Harv. (No. 444). We also collected another Composite in this locality, hitherto known only from Houw Hoek and Hottentots Holland mountains. This was *Thamniophyllum multiflorum* Harv. (No. 445), first collected by Dr. Thom, on whose sheet in the Kew Herbarium Harvey has written, "Most precious! The only specimen known to W. H. H." In addition, I gathered *Mundtia scoparia* Eckl. & Zeyh. (POLYGALACEAE) (No. 452), and an *Aster* very like *A. filifolius* Vent., but which has been distinguished and described by Compton as *A. Bodkinii* (No. 453). Others were *Erica intervallaris* Salisb. (ERICACEAE) (No. 446), with slender graceful branches, slightly pubescent leaves, and a multitude of small pink flowers; *Gladiolus gracilis* Jacq. (IRIDACEAE) (No. 447), and *Sarcocolla tetragona* (Berg.) Salter (PENAEACEAE) (No. 448), a small shrub, with densely imbricate leaves, rhomboid-obovate, leathery, and glabrous, and crimson flowers, in a terminal cluster.

On this excursion I was not able to gather many herbarium specimens, but dug up several interesting succulents, which were despatched that night to Kirstenbosch, whence Mr. Mathews, the Curator at that time, packed and forwarded them to Kew.

The next morning (1st September) was devoted to the inspection of the Botanical Reserve at Whitehill,¹ which contains a very interesting collection of succulent plants from all over the Karoo. The garden, at that time at any rate, was being run under great difficulties, chiefly through lack of funds. The species were being arranged geographically, those from different regions being kept together, which added to their interest.

In the afternoon we walked towards the Witteberg in the south-east and collected a few species. Professor Compton has made comprehensive collections of the flora of a small area surrounding the Karoo Garden, and his account will be found in a very interesting paper published in the *Transactions of the Royal Society of South Africa*, vol. xix, pp. 269–329 (1931). The area covered is described as within easy walking distance of Whitehill and Matjesfontein railway stations, extending from Bantams in the west to Bavianaans in the east, and from

¹ For an account of this Reserve see Compton in *Journ. Bot. Soc. S. Afr.*, pt. 7: 11 (1921).

the summit of Ngaap Kop in the north to the crest of the Witteberg Range in the south, a total area of about 40 square miles. Compton tells us in his valuable memoir that the Witteberg range of mountains provides a sharply contrasting formation, its vegetation being almost totally different from that of the Karoo, there being only two or three species common to the two areas. The Witteberg vegetation is of the

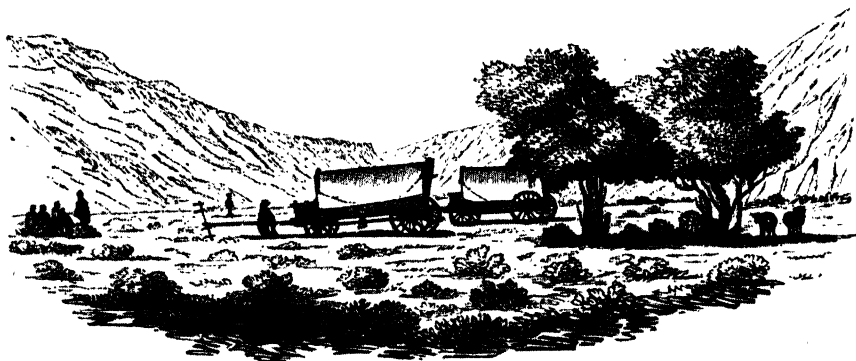


Flowering shoot and bladder-like fruit of *Nymania capensis* (Thunb.) Lindb. (MELIACEAE).

“Cape” type, PROTEACEAE, ERICACEAE, and RESTIONACEAE being abundant.

The annual rainfall at Whitehill averages about 5–6 ins., nearly all of it falling in winter (April–August). Drought years which occurred during Compton’s period of collecting prevented or reduced flowering considerably, and bush fires were in consequence abnormally destructive of the vegetation. He records that in the course of his visits he climbed to the summit of the Witteberg range fifteen times, and had on several occasions only a dozen or so flowering specimens to show for it.

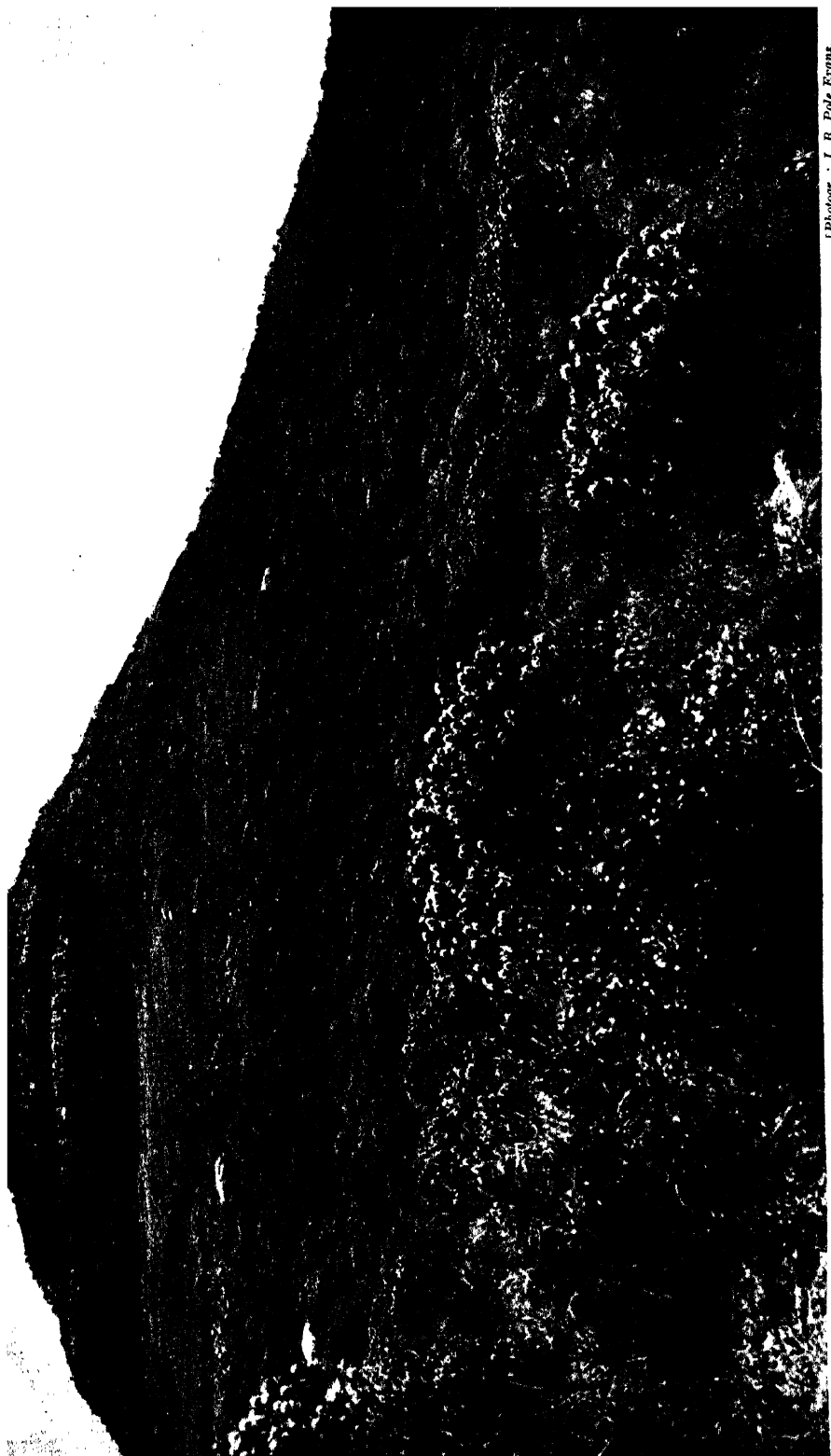
Compton’s account of the flora includes over 700 species of flowering plants and ferns, a surprising number, for to the eye of a layman the land appears to be a “desert”. He has brought to light no less than



Burchell's picture of Karoo Poort, showing the two trees which may be the same as those still there when visited by the author 120 years later (see photograph below).



Karoo Poort in 1928.



[Photogr. : I. B. Pde Evans.

The " Kreupelhout ", *Leucospermum conocarpum* R.Br. (PROTEACEAE), below Little Lion's Head, near Hout Bay, Cape Peninsula.

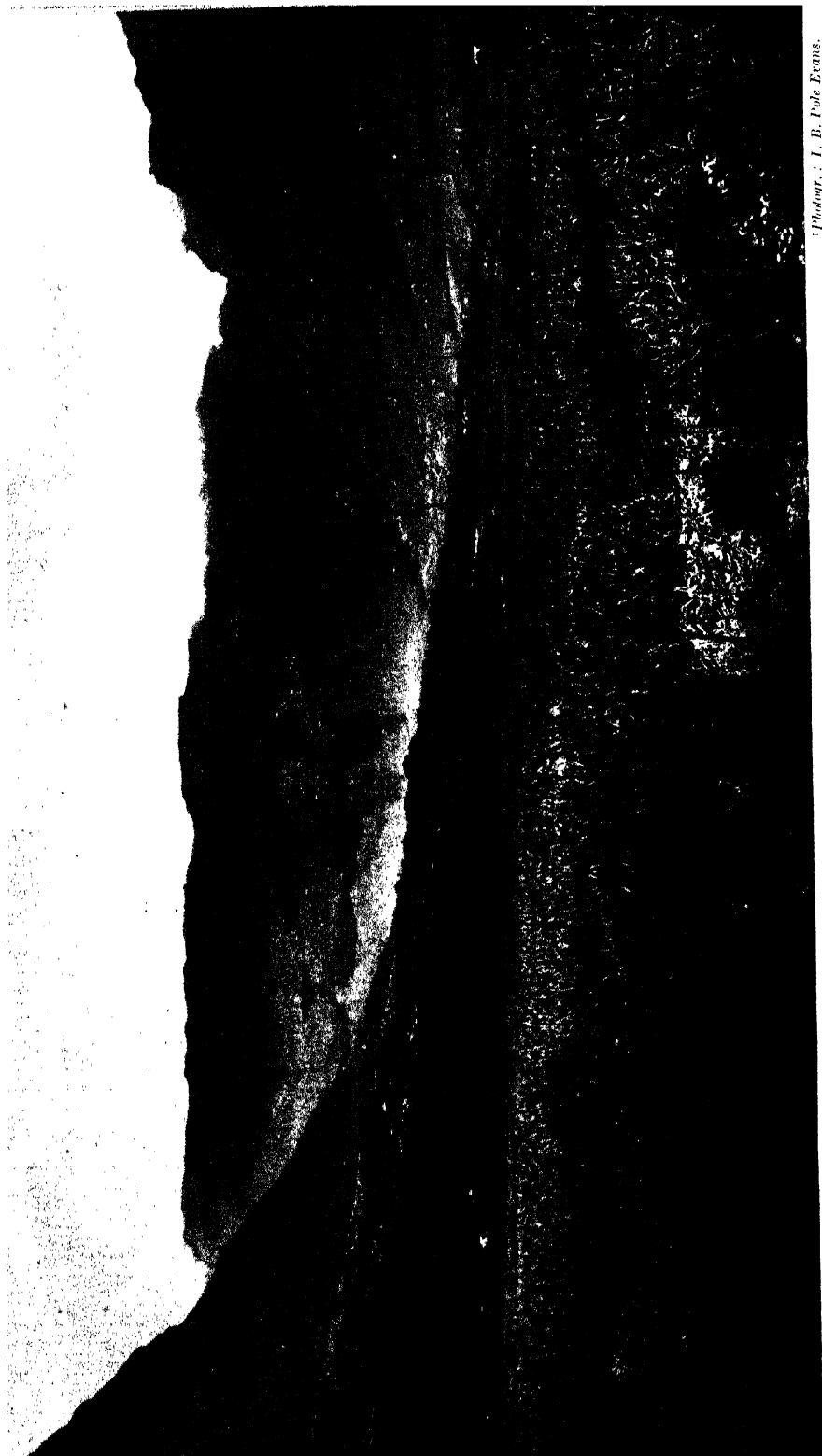


Photo: I. B. Pale Evans.

The "Palmiet", *Prionium serratum* E. Mey. (JUNCACEAE), near Hout Bay, Cape Peninsula.



Aloe comosa Marl. & A. Berg. (LILIACEAE), near Clanwilliam, Cape Province.

[Photogr. : I. B. Pote Evans.



[Photogr. : I. B. Pole Evans.]

The Oliphants River Valley near Clanwilliam.



[Photogr. : I. B. Pale Evans.

okerboom.", *Aloe dichotoma* Linn. f. (LILIACEAE), is typical of Namaqualand ; here they are shown scattered over the hills near Koegas in the Prieska Division.

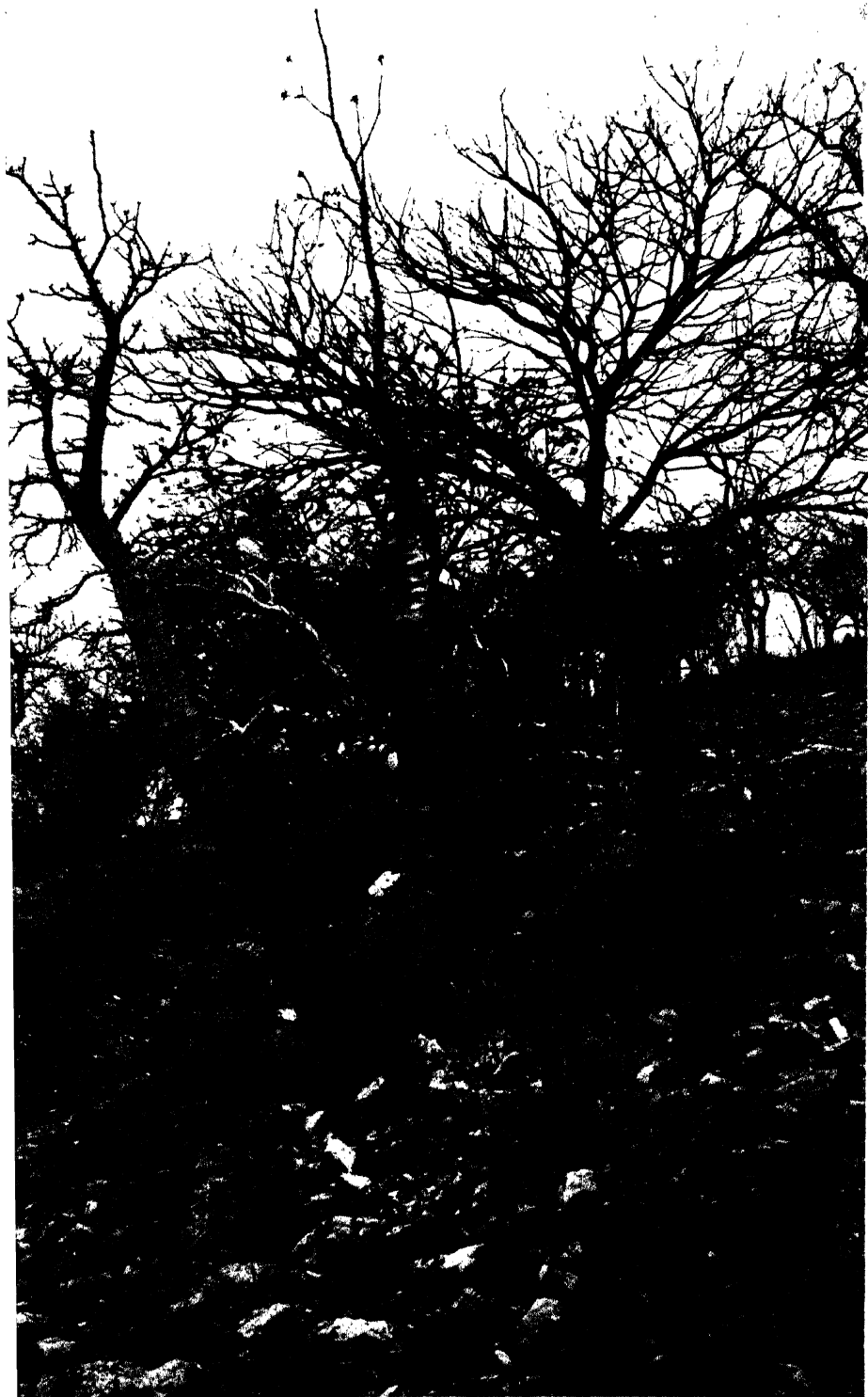


[Photogr. : I. B. Pole Evans.

The "Tsamma", *Citrullus vulgaris* Schrad. (CUCURBITACEAE), in the Kalahari.

Euphorbia gregaria Marloth (EUPHORBIACEAE), near Usakos, South West Africa.

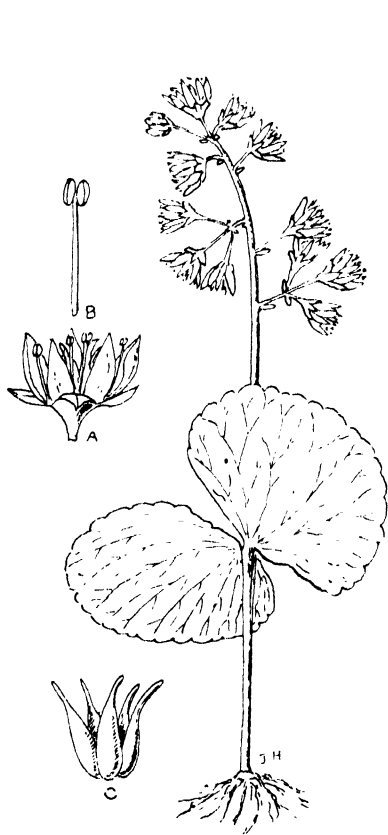
[Photogr. : I. B. Fode Evans.



[Photogr. : I. B. Pole Evans.]

Pachypodium giganteum Engl. (APOCYNACEAE), near Psumeb, South West Africa.

four new genera and fifty-two new species, which indicates very forcibly the desirability of intensive studies on similar small areas throughout South Africa. Bulbous plants are numerous, LILIACEAE heading the list with about fifty species, and IRIDACEAE twenty species. There are fifteen PROTEACEAE on the Witteberg, nine THYMELAEACEAE.



Crassula Weissii N.E. Br. (CRASSULACEAE), a tiny species growing under rocks at Karoo Poort.

A, flower; B, stamen.



Atriplex Halimus Linn. (CHENOPODIACEAE), from Karoo Poort.

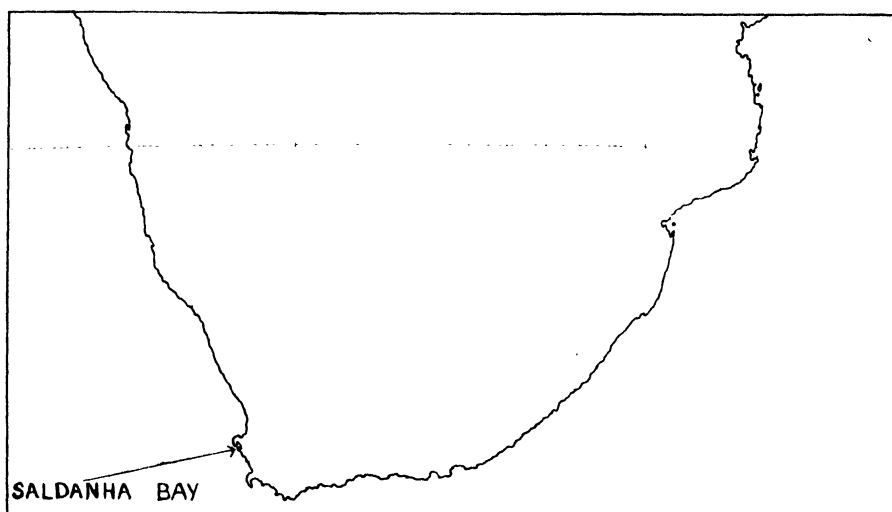
and twenty or more ERICACEAE. In the whole area COMPOSITAE is the largest family, with about 160 species, and CRASSULACEAE comes second, with about twenty species.

On the journey from Matjesfontein to Karoo Poort we traversed some weird portions of the Karoo. We took the road which led towards Sutherland for a few miles and then branched westwards through the plain. This was a seemingly endless monotony of nearly flat Karoo, barren except for the useless *Rhenoster Bush* (*Elytropappus*), and the poisonous *Cotyledon Wallichii* HARV. (CRASSULACEAE), which is very abundant in these districts, being avoided by stock; there were also

one or two species of *Pteronia* (COMPOSITAE). We passed a few small abandoned farms. The distances are very deceptive, and roads are not easy to follow, there being no signposts. Frequently the "spoor" of other cars had to be looked for, and it is a dangerous country for novices to find their way about.

Karoo Poort

At Karoo Poort we lunched under two trees exactly as pictured by Burchell; indeed, they may be still the same trees of *Rhus lancea* Linn. About here is a very interesting meeting-place of the Cape and



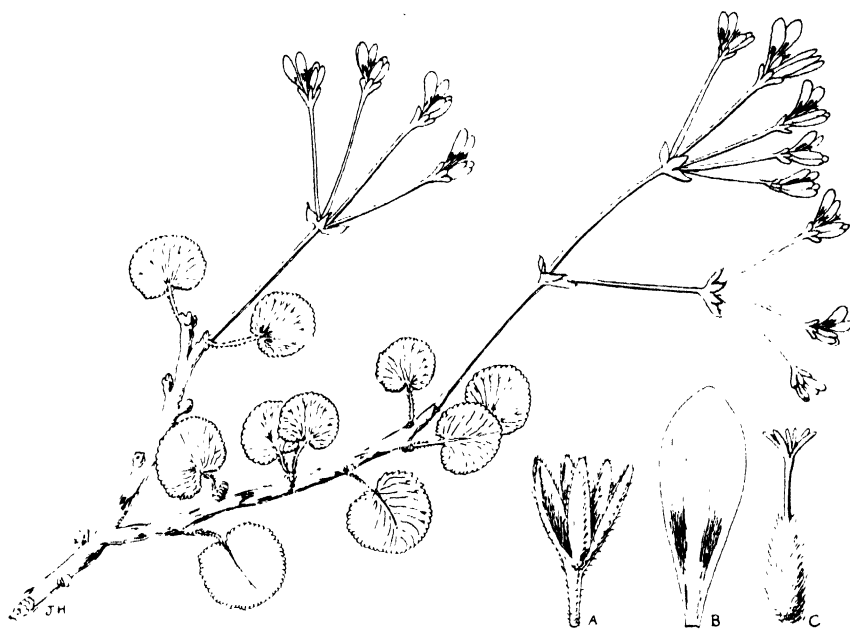
LIGNOSAE (WOODY DICOTYLEDONS)

Karoo floras, and we made a collection which is worth recording in systematic order :—

- PAPILIONACEAE—*Indigofera cardiophylla* Harr. (No. 440): a small shrub with small trifoliolate leaves, and small pedunculate clusters of pinkish flowers.
 THYMELAEACEAE—*Gnidia geminiflora* E. Mey. (No. 433): with very silky flowers.
Struthiola virgata Linn. (No. 436): with slightly pubescent flowers.
 ERICACEAE—*Erica Maximiliani* Guth. & Bolus (No. 451): with rather large white flowers and smooth turgid leaves.
 RHAMNACEAE—*Phyllica rigidifolia* Sond. (No. 434): with dense acicular leaves and short clusters of flowers globose in bud.
 ASCLEPIADACEAE—*Microlooma gibbosum* N.E. Br. (No. 439): a climber with narrow subcordate based leaves and small cymes of pink flowers.

HERBACEAE (HERBACEOUS DICOTYLEDONS)

- CRUCIFERAE—*Heliophila suavisissima* Burch. (No. 437): woody at the base; leaves linear, entire or with one or two lobes; flowers mauve.
 CRASSULACEAE—*Crassula Weissii* N.E. Br. (No. 443): a tiny species growing under rocks (see figure, p. 65). It was first collected near Matjesfontein by Professor F. E. Weiss in August 1905, and has since been gathered on the Witteberg by Compton.



Pelargonium rhodanthum Schltr. (GERANIACEAE), from Karoo Poort; flowers mauve.

A, calyx; B, petal; C, pistil.



Mr. N. S. Pillans, Professor and Mrs. Compton at Karoo Poort.

- CHENOPODIACEAE **Atriplex Halimus** Linn. (No. 442): a shrub with pale mealy leaves and interrupted spikes of very small flowers.
- COMPOSITAE—**Athanasia incisa** Harr. (No. 429): with tripartite leaves and yellow balls of small flower-heads. **Eriocephalus aromaticus** C. A. Smith (No. 450): with white ray-flowers and woolly achenes. **Senecio parvifolius** DC. (No. 431): a shrublet with small multipartite leaves and very lax corymbs of eradiate flower-heads. **Euryops lateriflorus** Less. (No. 441): with obovate sessile leaves and few shortly pedunculate heads with small rays. **E. Rehmannii** Compton (No. 435): a shrub $2\frac{1}{2}$ ft. high, with acicular leaves and numerous flower-heads with large yellow rays. This was first collected on the same spot by Burchell (No. 1199) in July 1811, and has since been gathered on the northern slopes of the Witteberg and described by Professor Compton,¹ who named it after Rehmann (2929), by whom it was first collected in the Witteberg.
- GERANIACEAE—**Pelargonium rhodanthum** Schlechter (No. 428): a shrubby species growing under the cliffs, with very small orbicular tomentose leaves and mauve flowers 3-5 in an umbel. **P. denticulatum** Jacq. (No. 449): a very sticky species with deeply cut foliage and small clusters of very shortly pedicellate flowers.
- BORAGINACEAE—**Lobostemon echioides** Lehm (No. 432): very scabrid; leaves lanceolate, sessile, about 2 cm. long; flowers pale blue, in small scorpioid terminal clusters.



[Photogr. : Mrs. Compton.]

A snowball fight in the Mitchell's Pass !

In the Mitchell's Pass there were snowdrifts a foot deep, and the neighbouring mountains were very beautiful, and covered with snow. I never expected to be seen snowballing in South Africa, and the Professor, Mr. Pillans, and myself could not resist the temptation to stop and indulge in it. Indeed, Mr. Pillans seemed to revel in it, and I am not sure that he did not even "coup his creels"² among it, as they say in the north of England.

We reached Ceres about three o'clock in the afternoon, and found, as we had feared, that the bridge was closed for repairs after recent

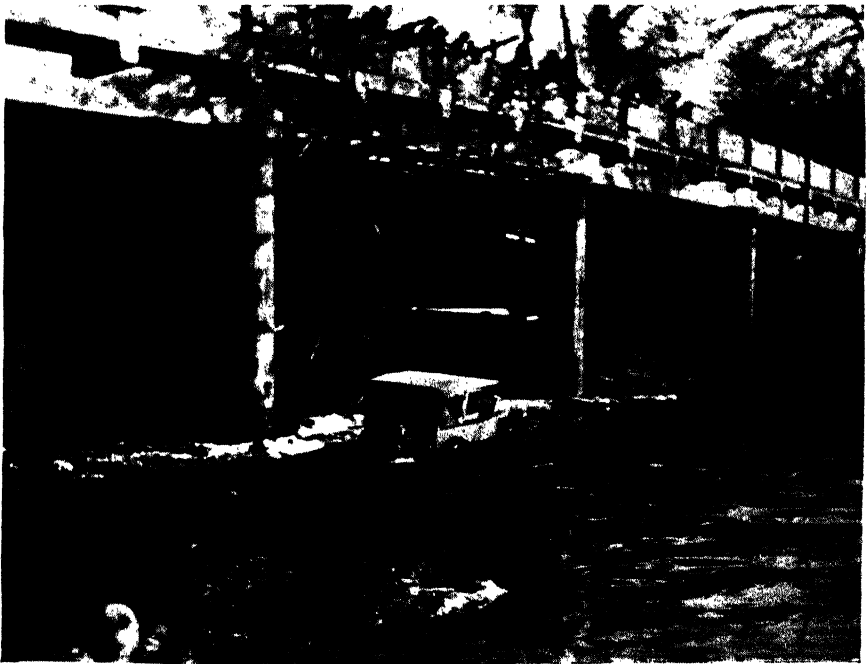
¹ *Trans. Roy. Soc. S. Afr.*, 19 : 321 (1931).

² Northumbrian expression for "to turn a somersault".



[Photogr. : Mrs. Compton.]

Mitchell's Pass from the south.



[Photogr. by the Author.]

Our car in difficulties at Ceres.

floods. But it takes something to daunt a South African motorist. As the water was still rather deep, a lorry was engaged to tow the car across. But the great force of the stream made steering very difficult among the rough stones and caused the car to drift obliquely against a beam, where it stuck in about $3\frac{1}{2}$ ft. of water. Another lorry from the town was sought, and it pulled the car (a fine Chrysler) back out of the jamb, and the first lorry at length succeeded in getting it across by heading more upstream. All this time Professor Compton, who had remained in the car to steer, was wet through, and no doubt had far greater cause for anxiety than his more fortunate passengers high and dry on the bank. Much to my surprise, the engine started up on the other side, but the oil had to be changed because of water having entered the engine-sump. Whilst this was going on we dined at the nearby hotel, thankful indeed that things had not turned out worse. We left at 8.30, and had a pleasant trip in the moonlight via Tulbagh Road, Paarl, and Durbanville to Cape Town, arriving at 1.15 a.m.—but it had been an eventful day !

Chapter VI

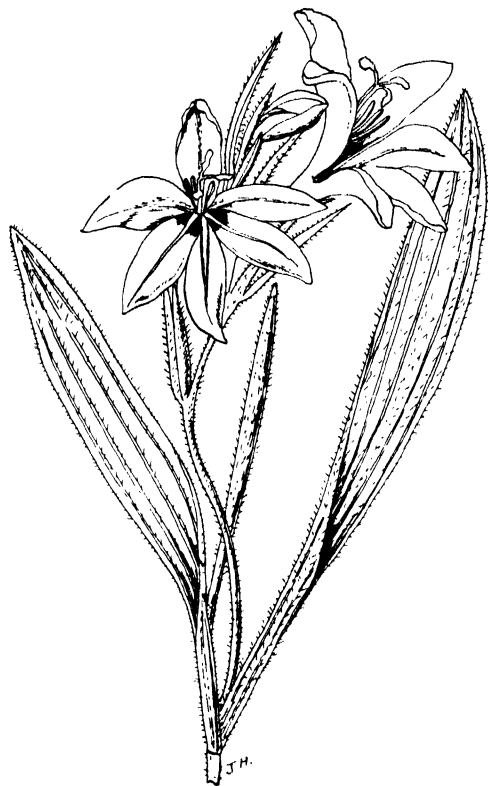
CAPE TOWN TO SALDANHA BAY

ON Tuesday, 4th September, accompanied by Mr. N. S. Pillans,¹ I started with the Government car on a collecting trip as far as Saldanha Bay. I wondered how many botanical travellers had gone on the same journey, but by very different means of locomotion! We took the Malmesbury Road, and commenced to botanise about 11 miles² from Cape Town, between Salt River and Kalabas Kraal. Around here I was apparently on classical ground, in a botanical sense, for these flats were the scene of activities of many of the early collectors, judging by the authorities after the names of the plants we found in flower, most of which were described 150 years ago or more.

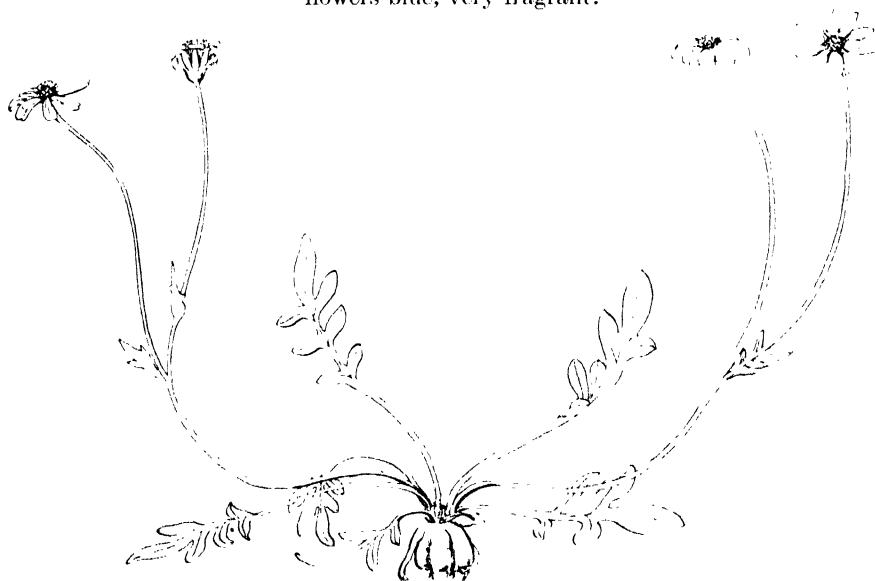
I was much impressed by the floral wealth hereabouts, and the spring flowers were at their very best, with beautiful sheets of *Oxalis compressa* L. (OXALIDACEAE), with flat petioles, the flowers at a little distance appearing very much like English primroses. There were lovely spreads of *Dimorphotheca plurialis* Moench. (COMPOSITAE), and a species of *Mesembryanthemum* which somewhat resembles it. Many South African plants seem to mimic one another, either in habit, foliage, or flowers. And the scent of some, at any rate, is delicious. For example, I have never smelled anything quite so sweet as a blue-flowered *Babiana*, *B. plicata* (Linn.) Ker (IRIDACEAE) (No. 173), which we collected 2 miles farther on. And near this same locality (11 miles from Cape Town) there was a tiny pale-blue-flowered *Romulea*, *R. longifolia* Baker (IRIDACEAE) (No. 154), with long linear grass-like leaves. A very small and common plant with relatively large flowers was *Oxalis variabilis* Lindl. (No. 155), with deep salmon-coloured pink-veined petals. A striking little plant was *Galaxia ciliata* Pers. (IRIDACEAE) (No. 160), a small herb mimicking an *Oxalis*, with pale-yellow flowers. This proved later to be an exact match of the figure in Plate 94 of Andrews' *Botanist's Repository*, on which this species is founded. Here we also gathered a remarkable Papilionaceous plant with prostrate stems arising from a huge woody tuber—*Euchlora hirsuta* (Thunb.) Druce (No. 163).

¹ Botanist in the *Bolus Herbarium*, who did much for me whilst in South Africa.

² Other plants collected at 11 miles from Cape Town were: No. 156, *Lachenalia orchoides* Ait. (LILIACEAE); 157, *Othonna pinnata* Linn. f. (COMPOSITAE); 158, *Berkheya palmata* Willd. (COMPOSITAE); 159, *Romulea hirsuta* Eckl. (IRIDACEAE); 161, *Diascia diffusa* (L. f.) Benth. (SCROPHULARIACEAE); 161a, *Morea tripetala* Ker (IRIDACEAE); 162, *Mesembryanthemum geminiflorum* Haw. (FICOIDACEAE); 164, *Hypoxis stellata* L. f. (HYPOXIDACEAE); 165, *Disperis circumflexa* (Linn.) Dur. & Schinz (ORCHIDACEAE) (*D. secunda* Thunb.); 166, *Phyllopodium heterophyllum* Benth. (SCROPHULARIACEAE); 167, *Hermannia cuneifolia* Jacq. (STERCULIACEAE); 168, *Aizoon sarmentosum* L. f. (FICOIDACEAE); 169, *Brachystelma crispum* Graham (ASCLEPIADACEAE); 170, *Lachenalia orchoides* Ait. (LILIACEAE); 171, *Muraltia dumosa* DC. (POLYGALACEAE).

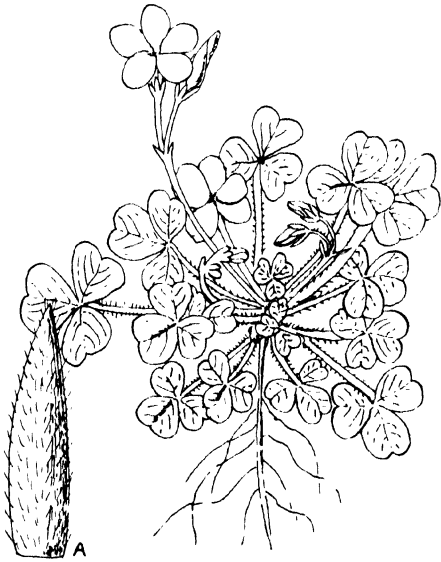


Babiana plicata (Linn.) Ker (IRIDACEAE),
flowers blue, very fragrant.



Othonna pinnata Linn. f.

At 13 miles ¹ as registered by speedometer from Cape Town we gathered a further batch of typically "Cape" plants, including *Euryops linifolius* DC. (COMPOSITAE) (No. 172), a shrub 2½ ft. high, with corymbs of small heads and yellow ray-flowers; *Lapeyrouisia Jacquinii* N.E. Br. (IRIDACEAE) (No. 174), very well illustrated by Jacquin (*Icones Plantarum*, Plate 269), and included in *L. anceps* Ker in the *Flora Capensis*; it is a herb with a "violet-like" perianth, the lip being striped. Another beautiful Irid was *Synnotia bicolor* Sweet (No. 175), a herb with a cream "lip" and purple "standard". There



Oculis compressa Linn. (OXALIDACEAE); flowers lemon-yellow, sweet-scented.

A, sepal; B, stamens and pistil.



Galaxia ciliata Pers. (IRIDACEAE); flowers pale yellow (after Andrews).

was a regular bed of IRIDACEAE here, including the sweet-smelling *Babiana* already mentioned, as my No. 176 proved to be *Romulea rosea* Eckl.

We were fortunate to pick a very rare species here, *Bulbine nutans* R. & S. (LILIACEAE) (No. 177), the *Anthericum nutans* of Jacquin (*Icones Plantarum*, Plate 407), previously known only from

¹ Other plants gathered were: No. 175a, *Indigofera incana* Thunb. (PAPILIONACEAE); 178, *Zygophyllum spinosum* Linn. (ZYGOPHYLLACEAE); 179, *Polygala affinis* DC. (POLYGALACEAE); 180, *Polygala bracteolata* Linn., a shrublet with pink petals and white crest; 181, *Melolobium humile* E. & Z. (PAPILIONACEAE) (an exact match of Drège's "*Sphingium spicatum* E.M.b."); 182, *Serruria trilopha* Knight (PROTEACEAE); 183, *Pelargonium hirtum* Jacq. (GERANIACEAE); 184, *Pelargonium flavum* Ait.; 185, *Thesium pubescens* A. DC. (SANTALACEAE); 186, *Microlooma sagittatum* R. Br. (ASCLEPIADACEAE); 188, *Aizoon paniculatum* L. (FICOIDACEAE); 189, *Limeum africanum* Burm. (MOLLUGINACEAE); 191, *Tetragonia herbacea* L. (FICOIDACEAE).



Euchlora hirsuta (Thunb.) Druce (PAPILIONACEAE).
A, flower; B, standard; C, wing; D, keel petals.



Lapeyrouisia Jacquinii
N.E. Br. (IRIDACEAE);
flowers violet-blue.

this drawing and a specimen collected by *Bolus* (3709) at Sea Point in 1877.

I have already referred to the widely distributed and variable *Osteospermum moniliferum* Linn. (COMPOSITAE) (see p. 53); here I collected the seemingly distinct variety, *lanosum* DC. (No. 187), a woolly semi-decumbent shrub of not very pleasing aspect. A straggly very hispid "*Mesembryanthemum*" with pink flowers proved to be now named *Drosanthemum hispidum* Schwantes (FICOIDACEAE) (No. 184 bis).

We next collected between Kalabas Kraal and Malmesbury.¹



Antholyza ringens Linn. (IRIDACEAE); upper part of inflorescence modified and indurated through the action of sun-birds, serving as a perch.

A representative of a genus of more tropical regions was *Indigofera discolor* E. Mey (PAPILIONACEAE) (No. 190), a procumbent shrublet with red flowers and trifoliate obovate discolorous leaflets. It seems to me to be distinct from *I. procumbens* Linn., with which it is united in the *Flora Capensis*. The next plant collected was a most interesting and delightful Irid, *Gladiolus alatus* Linn. (No. 192). This species usually produces one basal elongate rigid leaf which faces the inflorescence of strongly zygomorphic flowers. I wonder whether this

¹ Also collected : No. 193, *Hermannia patula* Harv. (STERCULIACEAE); 194, *Euphorbia genistoides* Berg. (EUPHORBIACEAE); 195, *Hermannia prismatocarpa* E. Mey. (STERCULIACEAE); 196, *Tetragonia spicata* L. f. (FICOIDACEAE); 197, *Lampranthus Frederici* L. Bolus (FICOIDACEAE); 200, *Polycarena gilioides* Benth. (SCROPHULARIACEAE).

leaf, which is sometimes very narrow and almost terete, functions like the barren termination of the stalk of *Antholyza ringens* L. (*Babiana ringens* Ker), which "serves as a perch for the sun-birds (*Cinnyris*) which visit the flowers, and in so doing effect cross-pollination" (Marloth). *G. alatus* ranges from the Oliphants River to Caledon,



Gladiolus alatus Linn. (IRIDACEAE); the rigid lowermost leaf has probably become modified through the action of sun-birds, serving as a perch.

whilst the so-called variety, *namaquensis*, which is really quite a distinct species and is the *G. equitans* of Thunb., occurs farther north, from Vanrhynsdorp to Little Namaqualand (see p. 155). Our No. 198 was a beautiful shrub of *Lobostemon*, *L. fruticosus* Buek (BORAGINACEAE), about 2 ft. high, with mauve and pink flowers. Since that time this genus has been revised by Dr. Levyns.¹

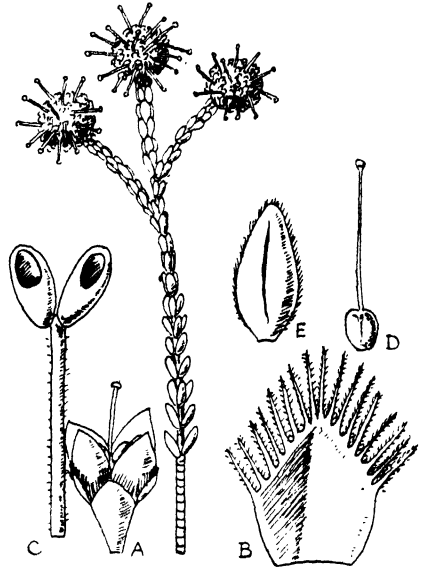
Between Malmesbury and Darling, and 4 miles² distant from the former place, we gathered some interesting species. No. 199

¹ See *Journ. Linn. Soc. Bot.* 49 : 393-451 (1934).

² Also collected : No. 201, *Mesembryanthemum geminiflorum* Haw. (FICOIDACEAE); 202, *Lobostemon paniculaeformis* DC. (BORAGINACEAE); 204, *Chrysocoma tenuifolia* Berg. (COMPOSITAE).

proved to be a *Bulbine*, *B. asphodelioides* R. & S. (LILIACEAE). A common Composite shrublet 1 ft. high, with hoary spathulate-linear leaves and sessile clusters of *Helichrysum*-like flower-heads with white bracts, was *Petalacte coronata* (L.) Don (No. 203), having been named *Gnaphalium coronatum* by Linnaeus. This is common in the western districts. No. 205 was a striking Ericaceous plant, *Grisebachia plumosa* Klotzsch, a shrublet 1-1½ ft. high, with little balls of deep-pink flowers, the calyx-lobes deeply cut up into plumose segments; whilst No. 206, a shrublet of similar stature, proved to be *Agathosma villosa* Willd. (RUTACEAE), a plant with a strong odour when bruised. About here grew two distinct species of *Muraltia*: our No. 207, a shrublet 1-1½ ft. high, with mauve-pink flowers, *M. filiformis* (Thunb.) DC. (POLYGALACEAE), and No. 208, *M. striata* DC., a taller slender shrub 3½ ft. high. I collected fine specimens of the wonderful Iridaceous plant (No. 209), which has been known to Cape botanists for a century or so as *Babiana ringens* Ker, but which should now be called *Antholyza ringens*, because it was first described as such by Linnaeus, and is actually the original species of the genus *Antholyza*. Even the tyro in botany may wonder why it has been associated for so long with the "Babiantjes" (*Babiana*). I have already mentioned this remarkable species on p. 76. In my opinion it represents, in almost every character, the most advanced type of the family IRIDACEAE. The root-stock is a corm covered with the fibrous remains of the leaf-bases, the upper part of the inflorescence is hardened, as already mentioned—probably an acquired character, owing to the action of sun-birds perching on the shoot during countless ages—and the flowers are very zygomorphic, the perianth being bilabiate and much compressed at the mouth, with the lips widely gaping. In fact the flower has quite an orchidaceous appearance, and may be regarded as an example of parallel development between the IRIDACEAE and ORCHIDACEAE.

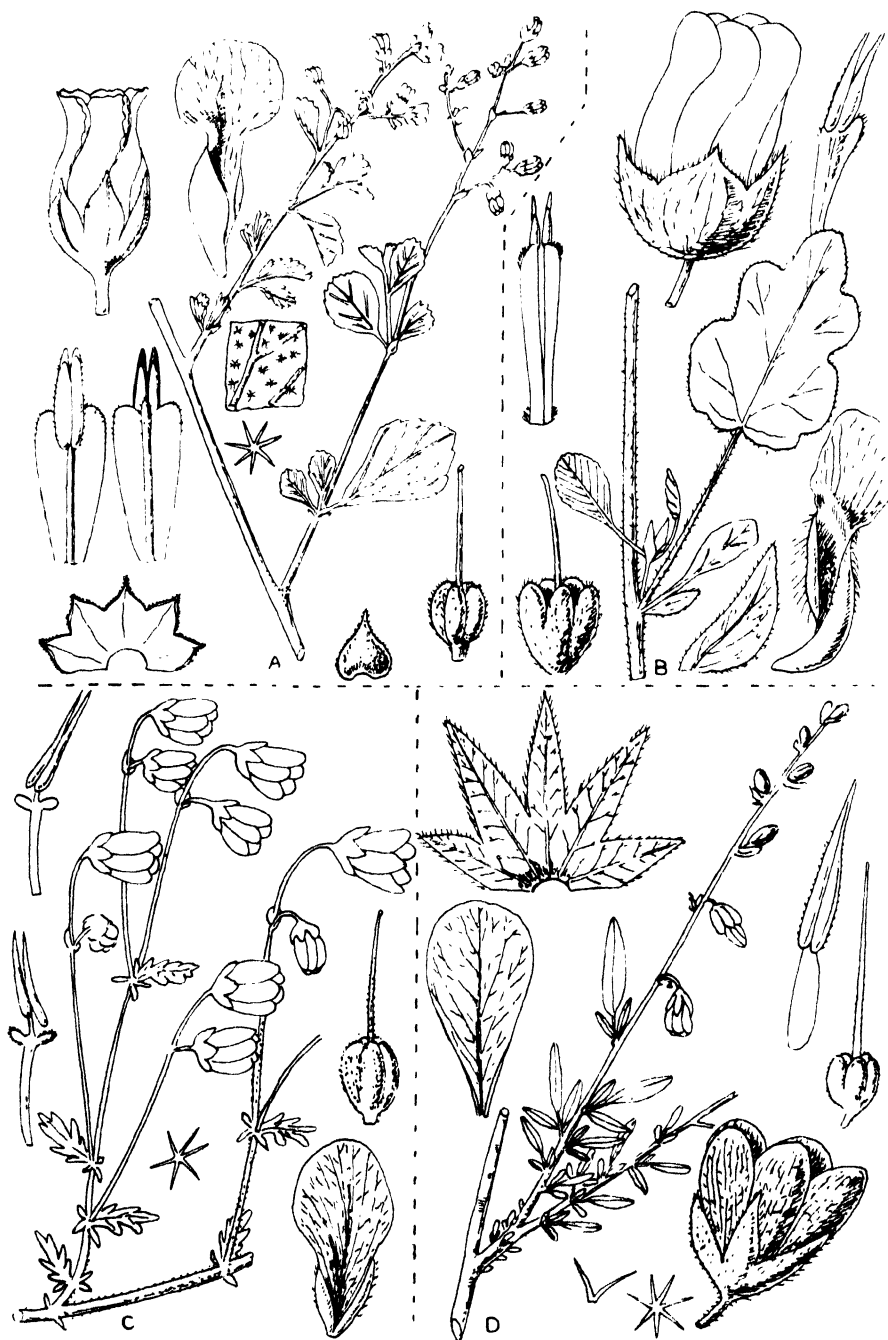
Hereabouts, on a rocky outcrop about 2 miles beyond Darling,¹ there were small expanses of a very pretty little annual Scrophulariaceous plant, *Manulea corymbosa* L.f. (No. 214), with cream flowers, a species which I thought at the time might be worth growing in our English gardens. I seem to have been the first to gather it since



Grisebachia plumosa Klotzsch (ERICACEAE).

A, single flower; B, sepal; C, stamen; D, pistil; E, leaf.

¹ Also collected: No. 210, *Polycarena gilioides* Benth. (SCROPHULARIACEAE); 211, *Gladiolus trichonemifolius* Ker (IRIDACEAE); 122, *Ursinia anthemoides* Poir. (COMPOSITAE); 213, *Arctotis candida* Thunb. (COMPOSITAE); 215, *Tetragonia portulacoides* Fenzl (AIZOACEAE); 218, *Hebenstreitia dentata* L. (SELAGINACEAE).



Four species of *Hermannia* (STERCULIACEAE), collected on the way to Saldanha Bay.

A, *H. alnifolia* L.; B, *H. althaeifolia* L.; C, *H. diffusa* E. Mey; D, *H. trifurcata* L.—Orig.

Thunberg and Masson's time, for no specimen has appeared since then in the Kew herbarium. Other beautiful Scrophulariaceous plants were *Diascia Bergiana* Link & Otto (No. 216), with pinnately divided leaves and large purplish flowers, and *Nemesia grandiflora* Diels (No. 217), with yellow flowers, an orange "hump" on the lower lip, and a veined upper lip. No. 219 proved to be *Anthericum ciliolatum* Moss (LILIACEAE), a herb with tiny tuberous roots, densely fibrous base, and pinkish-white flowers tinged outside with red. An Asclepiad (No. 220), with a *radice diabolica longissima* (we dug down a foot, but failed to reach the tuber!) was *Eustegia filiformis* Schultes; the corolla green and the corona white.

This district ¹ is a veritable "Garden of Eden" for *Hermannia* (STERCULIACEAE), a large genus very rich in species in South Africa. We collected four of them (see p. 78): *H. diffusa* Jacq. (No. 226), procumbent, with yellow flowers and small pinnately divided leaves; *H. alnifolia* L. (No. 227), a shrublet with small panicles of very small flowers and obovate-cuneate alder-like leaves; *H. althaeifolia* L. (No. 228), erect, up to 2 ft., with large orange flowers, a densely pilose calyx, and *Althaea*-like or *Malva*-like leaves, and *H. trifurcata* L. (No. 230), very woody, with narrow, entire or 2—3-toothed leaves, and racemes of pendulous mauve-purple flowers. We found only one example of *Lachenalia mutabilis* Sweet (LILIACEAE) (No. 229), the outer perianth mauve in bud, the inner green. Between Hopefield and Vredenburg was a small malvaceous shrub with pinkish-white flowers, which has proved to be *Malvastrum Alexandri* E. G. Baker.

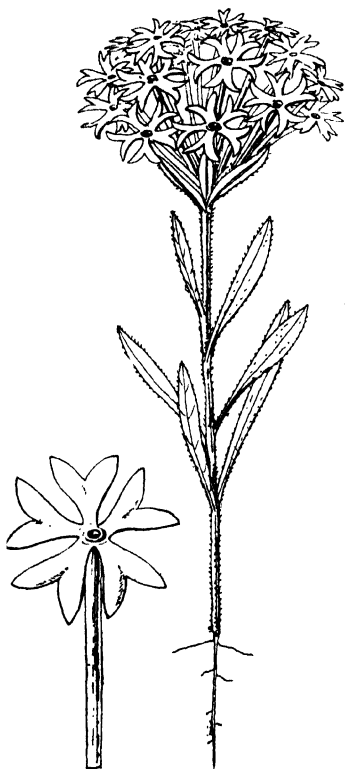
Slopes South of Vredenburg

On the slopes south of Vredenburg we collected specimens of an interesting genus of LILIACEAE, *Wurmbea capensis* Thunb. (No. 235). The tribe to which this belongs is entirely austral in its distribution, occurring only in South and Tropical Africa and in Australia, and is remarkable in the family on account of the flowers being *without bracts*. Their progenitors, or at any rate what I take to be such, the JUNCAGINACEAE, are devoid of bracts, and are also mainly from the Southern Hemisphere. If the South African student will ponder on this fact he may come to the conclusion that genera like *Wurmbea* have originated in the Southern Hemisphere.

A pilose prostrate legume (No. 237) with trifoliolate leaves and leaf-like stipules and yellow flowers in heads proved to be *Lotononis tenuifolia* (E. & Z.) Dümmer. It is distributed from this area (Vredenburg) to Hottentot's Holland Mountains. I was so attracted by a small Scrophulariaceous plant (No. 239) that I made a water-colour painting

¹ Also collected: No. 221, *Lebeckia Meyeriana* E. & Z. (PAPILIONACEAE) (known previously mainly from the Cape Peninsula); 222, *Manulea Benthamiana* Hiern (SCROPHULARIACEAE); 223, *Aspalathus jacobaea* E. Mey. (PAPILIONACEAE); 224, *Babiana tubiflora* Ker (IRIDACEAE); 225, *Lachenalia orchiioides* Jacq. (LILIACEAE); 231, *Salvia aurea* L. (LABIATAE); 232, *Romulea hirsuta* Eckl. (IRIDACEAE); 233, *Morea crispa* Ker (IRIDACEAE); 234, *M. setifolia* (L. f.) Druce; 236, *M. setifolia* (L. f.) Druce; 238, *Heliophila acuminata* (E. & Z.) Steudel (CRUCIFERAE); 241, 242, *Hebenstreitia dentata* L. (SELAGINACEAE); 246, *Hermannia heterophylla* (Cav.) Schinz (STERCULIACEAE).

of it. It bears the long and formidable name of *Zaluzianskya selaginoides* Walp., the corolla being a beautiful mauve with an orange "eye". This would probably grow well in pots or pans in cool green-houses in Britain. A large patch of an annual *Senecio* (No. 240), with the habit of our common groundsel, and with yellow ray-flowers, was the *S. abruptus* Thunb. A low-growing *Crotalaria* (No. 243) with solitary yellow flowers proved to be *C. excisa* (Thunb.) Bak. f. (PAPILIONACEAE). A prostrate species of *Indigofera* was noticeable,



Zaluzianskya selaginoides Walp.
(SCROPHULARIACEAE), between Hopefield and Vredenburg, Cape Province; corolla mauve with orange "eye"; a beautiful annual.

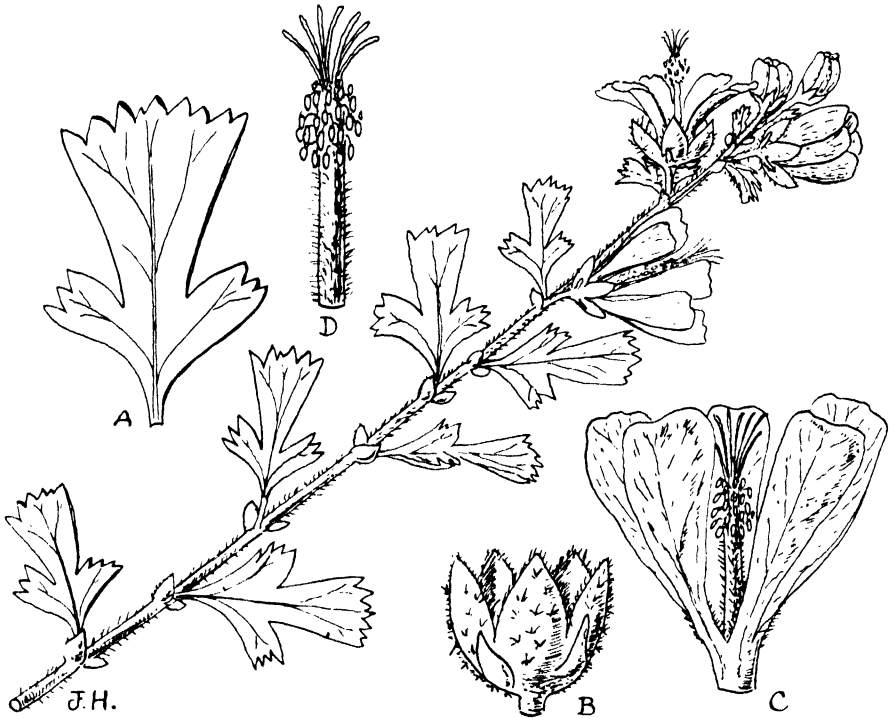


Crotalaria excisa (Thunb.) Bak. f. (PAPILIONACEAE); flowers yellow.

being *I. incana* Thunb. (No. 244), with a silvery trifoliate leaves, large subulate stipules, and racemes of scarlet flowers. No. 245 was a small malvaceous shrub with tiny oak-like leaves and pinkish-white flowers—*Malvastrum Alexandri* E. G. Bak., named after Alexander Prior, whose herbarium was given to Kew. The slopes south of Vredenburg yielded also the following conspicuous plants:¹ *Lebeckia sericea* Thunb. (PAPI-

¹ 248, *Viborgia fusca* Thunb. (PAPILIONACEAE); 251, *Mesembryanthemum* sp.; 252, *Mesembryanthemum* sp. (FICOIDACEAE); 253, *Viborgia sericea* Thunb. (PAPILIONACEAE); 255, *Leucadendron adscendens* R. Br. (PROTEACEAE); 256, *Leucospermum candicans* Loud. (PROTEACEAE); 257, *Metalasia divergens* Don (COMPOSITAE); 258, *Passerina filiformis* Linn. (THYMELAEACEAE); 271, *Zaluzianskya selaginoides* Benth. (SCROPHULARIACEAE); 272, *Indigofera spinescens* E. Mey. (PAPILIONACEAE).

LIONACEAE) (No. 247), a grey shrub, with long petioles and narrow leaflets, and racemes of pale yellow flowers; an intricately branched, very hispid *Mesembryanthemum* (No. 249), now called *Drosanthemum hispidum* (L.) Schwantes (FICOIDACEAE), *Struthiola virgata* L. (THYMELAEACEAE), (No. 250), a shrublet with small axillary cream flowers. Our No. 254 had been collected between Hopefield and Vredenburg several miles from the sea, and labelled later; this was a beautiful reddish-pink *Limonium*, *L. roseum* (Sm.) O. Kuntze (PLUMBAGINACEAE); I had



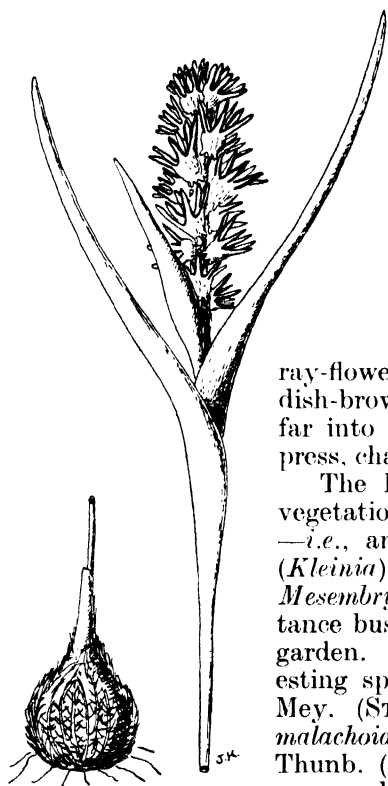
Malvastrum Alexandri E.G. Baker (MALVACEAE), between Hopefield and Vredenburg.

A, leaf; B, calyx; C, petals, stamens, and styles.

somehow the mistaken notion that *Limonium* (*Statice*) grew only near the sea; and between Darling and Hopefield, No. 259, *Phylica Harveyi* Pillans (RHAMNACEAE), a small shrub with tight balls of flowers and cordate leaves; No. 260, *P. cylindrica* Wendl, tall shrubs up to 3½ ft., with smaller heads and linear leaves; No. 261, *P. stipularis* L.; No. 262, *P. cephalantha* Sond., with very small heads.

Having previously studied the genera of FUMARIACEAE in detail (*Kew Bulletin*, 1921, 97), I was delighted to come across at Hoetjes Bay (5th September) *Cysticapnos africana* Gaertn. (No. 263), a weak straggling herb with pink flowers and bladder-like fruits; and this same locality yielded two species of *Zygophyllum*: *Z. cordifolium* Thunb. (ZYGOPHYLLACEAE) (No. 264), prostrate, with orbicular leaves and pale-yellow flowers, and *Z. sessilifolium* L. (No. 265), erect and woody, with spatulate-oblongate leaves, yellow petals red at the

base, besides some familiar (COMPOSITAE; the real and typical *Aster elongatus* Thunb. (No. 266), the ray-flowers white but red at the base;

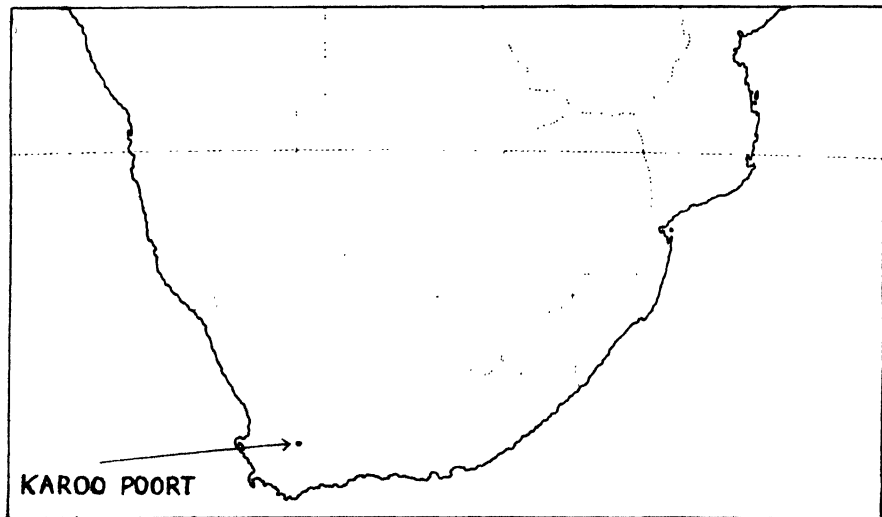


Wurmbea capensis
Thunb. (LILIACEAE),
near Vredenburg; per-
ianth-segments black.

Othonna cylindrica DC. (No. 267), a shrub with turgid fleshy linear leaves and small corymbs of yellow flowers; this ranges from Malmesbury Div. northwards to Little Namaqualand; *Venidium hirsutum* Harv. (No. 273), a small herb with white rays but black at the base; *Arctotis leptorhiza* DC. (No. 274), orange ray-flowers and black at the base, with the common *Dimorphotheca plurialis* (L.) Moench. (No. 275) in soil near the seashore, the

ray-flowers white with purple base, but, reddish-brown on the under-surface. We worked far into the night putting specimens into the press, changing paper, and writing up notes.

The hills north of Saldanha Bay bear a vegetation very much of the Namaqualand type—i.e., an abundance of fleshy *Senecio* spp. (*Kleinia*), and here and there vivid clumps of *Mesembryanthemum* resembling at a short distance bushes of "*Azalea indica*" in an English garden. The district yielded some very interesting species: *Hermannia prismatocarpa* E. Mey. (STERCULIACEAE) (No. 276), *Erodium malachoides* Willd. (No. 277); *Doria perfoliata* Thunb. (COMPOSITAE) (No. 278), an erect herb among bushes, with deeply cordate sessile leaves, and paired discoid heads of pale-yellow flowers. Another herb with amplexicaul leaves was *Heliophila amplexicaulis* L. (CRUCIFERAE)





Aster elongatus Thunb. (COMPOSITÆ); ray flowers white, red at the base.

A, bracts; B, ray-flower; C, disk-flower; D, stamens.

(No. 279), with white flowers and torulose fruits. But I was most delighted on again reaching home to find that our No. 280 was indeed a rarity, being *Chamira cornuta* Thunb. (CRUCIFERAE). Probably I was near the very spot where Thunberg himself had gathered it at Witteklip 150 years ago, and had I been like one David Ross botanising in the Pyrenees in 1862, I should have fallen on my knees as he did on finding a rare Composite, *Aster pyrenaeus*. As an example of botanical



Doria perfoliata Thunb. (COMPOSITAE).

exultation, Ross' remarks seem worth quoting, for enthusiasm, though it be extravagant, is preferable to indifference. Here is Ross botanising in the Pyrenees with a party of French botanists :—¹

“At this point of our explorations M. Chatin enthusiastically exclaimed ‘*Voilà la plus rare plante des Pyrenees!*’ While he triumphantly held it in his hand, I went up to him to scan it well, and heard its name, viz. the

Aster pyrenaeus.

“Inflamed with a passion I had felt before not to be outdone, and

¹ D. Ross, *Account of Botanical Rambles in the Pyrenees in August 1862*; p. 23 (Edinburgh 1863); pp. 67.

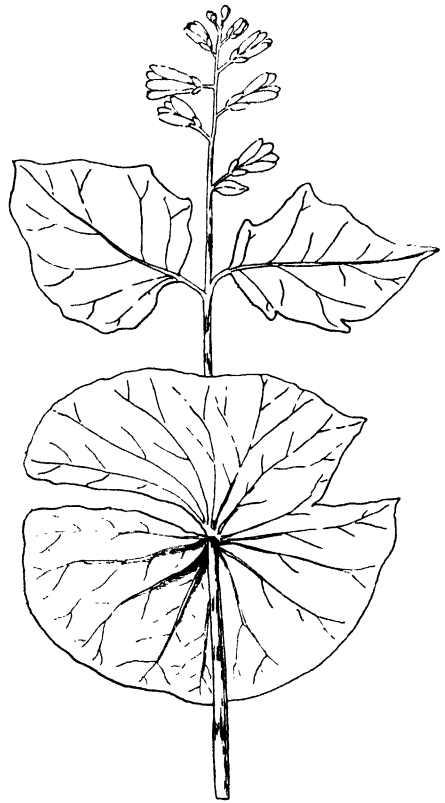
encouraged also with something like a presentiment that I would succeed in compassing an object greatly desired, I went forth on my own account somewhat excited. I searched long without any good result; at length fortune smiled, and I fell on a specimen, then another, then a third, and last a fourth. My joy was now unbounded, and greater than that of those who find great spoil. I felt

‘Again my slumbering virtue rose within me.’

This little incident acted like a stimulant on me, labouring as I did at the time under a degree of indisposition. Such a mystic virtue does the sight of plants inspire.”

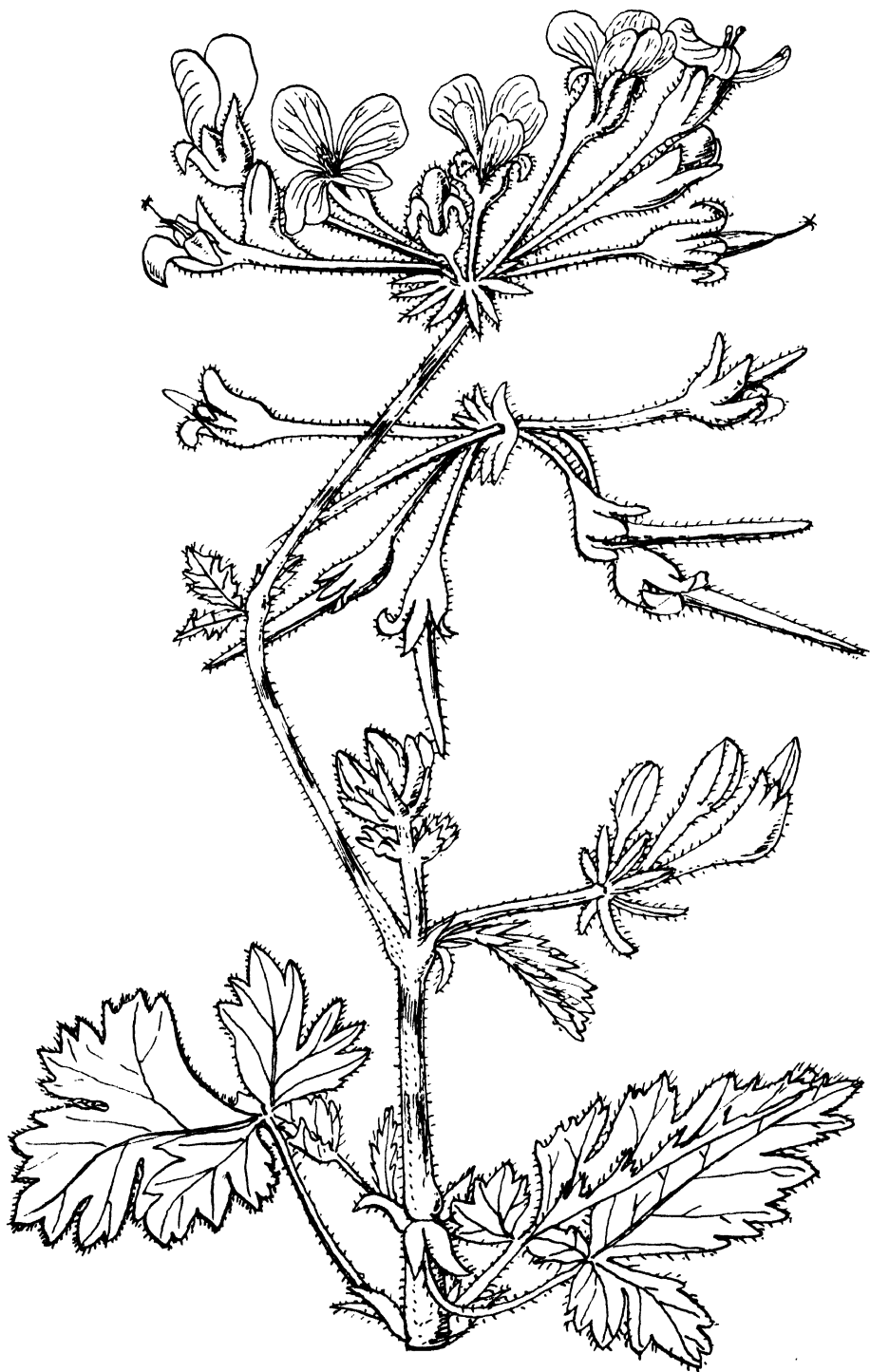


Heliophila amplexicaulis Linn.
(CRUCIFERAE); flowers white.



Chamira cornuta Thunb. (CRUCIFERAE),
a rare species first collected by Thun-
berg; flowers white.

We were not at all likely to rave over our own rarity, for it was a weak soft fleshy plant with sessile orbicular-cordate toothed leaves, small racemes of white flowers, and remarkable in having the two lateral sepals spurred at the base. It was also found by Drège at Witteklip, and by Schlechter at Hoek (Clanwilliam), some distance away. Dr. Murphy, R.N., collected a very similar plant, which may or may not be distinct, at Zwartkop, Simonsbay, and Wolley-Dod



Pelargonium fulgidum Willd. (GERANIACEAE); flowers scarlet.
After *Bot. Mag.*

the same species near Smitwinkel Bay and Chapman's Bay. Cape botanists should watch for this rarity on the Peninsula. The next specimen we gathered was growing under the larger rocks, being a familiar type of scarlet "Geranium", with pinnatipartite leaves and umbels of small gorgeously scarlet flowers, *Pelargonium fulgidum* (L.) Ait. (No. 281). This species was cultivated in England as early as 1732, and is a very old inhabitant of our greenhouses. It ranges from Saldanha Bay to Namaqualand.



Othonna frutescens Linn. (COMPOSITAE).

A, ray flower; B, achene and pappus; C, disk flower; D, anthers; E, upper part of style.

Among the boulders at Saldanha Bay were three striking COMPOSITAE, *Arctotis candida* Thunb. (No. 282), shrubby, 3-4 ft. high, with rich lemon-yellow ray-flowers, red-veined below; *Didelta carnosum* (Thunb.) Ait. (No. 283), with large leaf-like bracts in two series—hence the generic name—and beautiful bright yellow flowers; this ranges the coast from here northwards to Port Nolloth. Our No. 284 proved to be another rarity, *Othonna frutescens* L., known only in Thunberg's collection, and in Alexander Prior's from Kalk Bay. IRIDACEAE were represented by *Ferraria undulata* L. (No. 285), CRUCIFERAE by *Heliophila integrifolia* L. (No. 286), and the SCROPHULARIACEAE by *Nemesia affinis* Benth. (No. 287). 288, *Ruschia Hutchinscnii* L. Bolus (FICOIDACEAE). A tiny *Crassula* (No. 290) proved, after some search, to be *C. brevifolia* (E. & Z.) Harv.

Some twenty-five years previously I had "sorted out" the South African species of *Cineraria*, and I then marked a small specimen collected at Saldanha Bay by Admiral Sir F. Grey as probably an undescribed species. My delight may well be imagined when, working up my collection in the herbarium, I found that I had gathered a fine series of this species from the same locality! It was growing on the rocks near the sea, a densely leafy plant with reniform lobulate-dentate foliage, and yellow flower-heads on rather long peduncles (No. 289), and proves to be the long-lost *C. humifusa* L'Herit.,¹ based on a specimen collected by Masson, and assigned to the "doubtful



Dimorphotheca fruticosa (L.) Less. (COMPOSITAE).

species" in the *Flora Capensis*. A very beautiful *Dimorphotheca* (No. 292) grew in the same situation; it is a fleshy herb with entire spatulate leaves and white ray-flowers, red below—*D. fruticosa* (L.) Less.

The tropical flora,² with which I am more familiar, was vividly brought to mind when my companion pointed out a species of *Loranthus*, *L. glaucus* Thunb. (No. 294) with brick-red flowers parasitic on shrubs of *Lycium tetrandrum*. No. 295 proved to be *Senecio corymbiferus* DC., being the same as the plant which we recorded for the first time on the Cape Peninsula (see p. 55). Our No. 297 proved also to be a rare species, *Senecio aloides* DC., previously having been collected only by Drege in Little Namaqualand, and by Bolus at Saldanha Bay (No. 12,732) in 1905. We found only one specimen, a shrub with terete

¹ It has since been collected in the same locality by Salter, no. 3922.

² Other plants collected here, 291, *Silene undulata* Otto (CARYOPHYLLACEAE); 293, *Othonna cylindrica* (Lam.) DC. (COMPOSITAE); 296, *Indigofera candicans* Ait. (PAPILIONACEAE); 298, *Sutera linifolia* O. Ktze. (SCROPHULARIACEAE); 299, *Tripteris clandestina* Less. (COMPOSITAE).

leaves and yellow flower-heads. Our collection among these maritime hills closed with the gathering of No. 300, *Gymnosporia buxifolia* (L.) Szysz., with sweet-smelling, hawthorn-like flowers; 301, *Urginea exuviala* Steinh. (LILIACEAE), about 2 ft. high, with persistent purplish basal sheaths transversely ridged and greenish-white flowers.

As the weather became unsettled and my companion's leave was limited, we decided to return to Cape Town, for which we departed at three o'clock in the afternoon. It rained nearly all the way back, and I had rather an anxious drive during the hundred odd miles to Cape Town, as the engine of the Government car was knocking badly and



The long-lost *Vincetoxicum humifusum* L'Herit.; ray-flowers yellow.

pulling very poorly, due, as we discovered later, to a cracked piston. However, we arrived at Mr. Pillans' residence at eight o'clock, after a most successful and enjoyable trip.

On the journey between Vredenburg and Hopefield we had gathered *Claytia rubricaulis* Eckl. var. *tenuifolia* Prain (EUPHORBIACEAE) (No. 303), and *Leucospermum tomentosum* (Thunb.) R. Br. (PROTEACEAE) (No. 304), a shrub 2½ ft. high, with hoary linear leaves and cone-like heads of yellow flowers, and between Darling and Hopefield *Cyphia Phyteuma* (L.) Willd. (No. 305), a scapigerous, campanulaceous plant with smoke-blue flowers.

I have given a fairly detailed account of this botanical excursion to Saldanha Bay in order to convey to the home botanist some idea of the great wealth of the South African flora, especially in species growing within a short range of each other. Perhaps in no other part of the world may one meet with so many different species in the course of a day's botanical ramble as in the Western Cape Province.

Chapter VII

HOTTENTOT'S HOLLAND, TULBAGH, CALEDON, PAARL AND CERES

ON 8th September, having collected the Government car, which had been repaired, I went for a trial run as far as Muizenberg. I climbed a short way up the mountain at Muizenberg, and collected only four plants which particularly caught my eye, *Sutera hispidula* (Thunb.) Druce (SCROPHULARIACEAE) (No. 306); *Senecio glutinosus* Thunb. (COMPOSITAE) (No. 307), a very sticky strongly scented herb with pale yellow flower-heads, *Simocheilus glabellus* Thunb. (No. 308), an Ericaceous shrublet with crowded small flowers; and *Fagelia bituminosa* DC. (PAPILIONACEAE) (No. 309).

That evening I was busy changing plants in the presses and writing up my diary, the latter not being too easy to keep up to date, as wet days are rare at this time of the year. I packed in readiness for a short tour with Dr. Marloth the next day.

The morning of Sunday, 9th September, was one such as South Africa can produce with clock-like regularity. I met Dr. Marloth at nine o'clock at Adderley Street, and we took the road via Salt River bridge for Sir Lowrys Pass, a locality with a peculiar fascination for me, perhaps because it was such a favourite hunting-ground for Rudolph Schlechter. On that particular morning the road was bad, and full of pot-holes, over which the engine was inclined to "knock". The early promise of a glorious day was, however, not fulfilled, for the rain soon came down very hard indeed. We passed through Somerset West, the name of a locality familiar to botanists, and at 10.30 reached Mrs. Solly's farm, an old Dutch house built about 1795. I was much interested in the architecture; for example, one stepped out of the yard right into the dining-room. Mrs. Solly, a keen social worker and lover of plants, soon had us out in the field again, and we took a walk into the Hottentot's Holland mountains, Dr. Marloth keeping up a running commentary all the time. We collected many things which I had seen only in the herbarium at Kew, and there were lovely stretches of *Leucadendron* (PROTEACEAE), pink, yellow, and white. A considerable portion of the farm at that time was of the nature of a botanical reserve, which showed a fine example of the public spirit of its owner.

In the afternoon we went farther into the mountains above the railway. Among the plants which particularly caught my eye and were collected were the following: ¹ *Brunia alopecuroides* Thunb. (BRUNI-

¹ Also collected: No. 315, *Cliffortia polygonifolia* Linn. (ROSACEAE); 316, *Agathosma commutata* Loud. (RUTACEAE); 317, *Gladiolus alatus* Thunb. (IRIDACEAE); 318, *Struthiola tetralepis* Schltr. (THYMELAEACEAE); 320, *Agathelpis angustifolia* Choisy (SELAGINACEAE); 321, *Pelargonium triste* Ait. (GERANIACEAE); 322, *Metalsia rosea* DC. (COMPOSITAE); 326, *Senecio incertus* DC. (COMPOSITAE); 328, *Cyphia volubilis* (Thunb.) Willd. (CAMPANULACEAE); 329, *Hermannia flammea* Jacq. (STERCULIACEAE); 330, *Erica imbricata* Linn. (ERICACEAE); 334 and 335, *Microtoma tenuifolium* (Linn.) K. Schum. (ASCLEPIADACEAE).

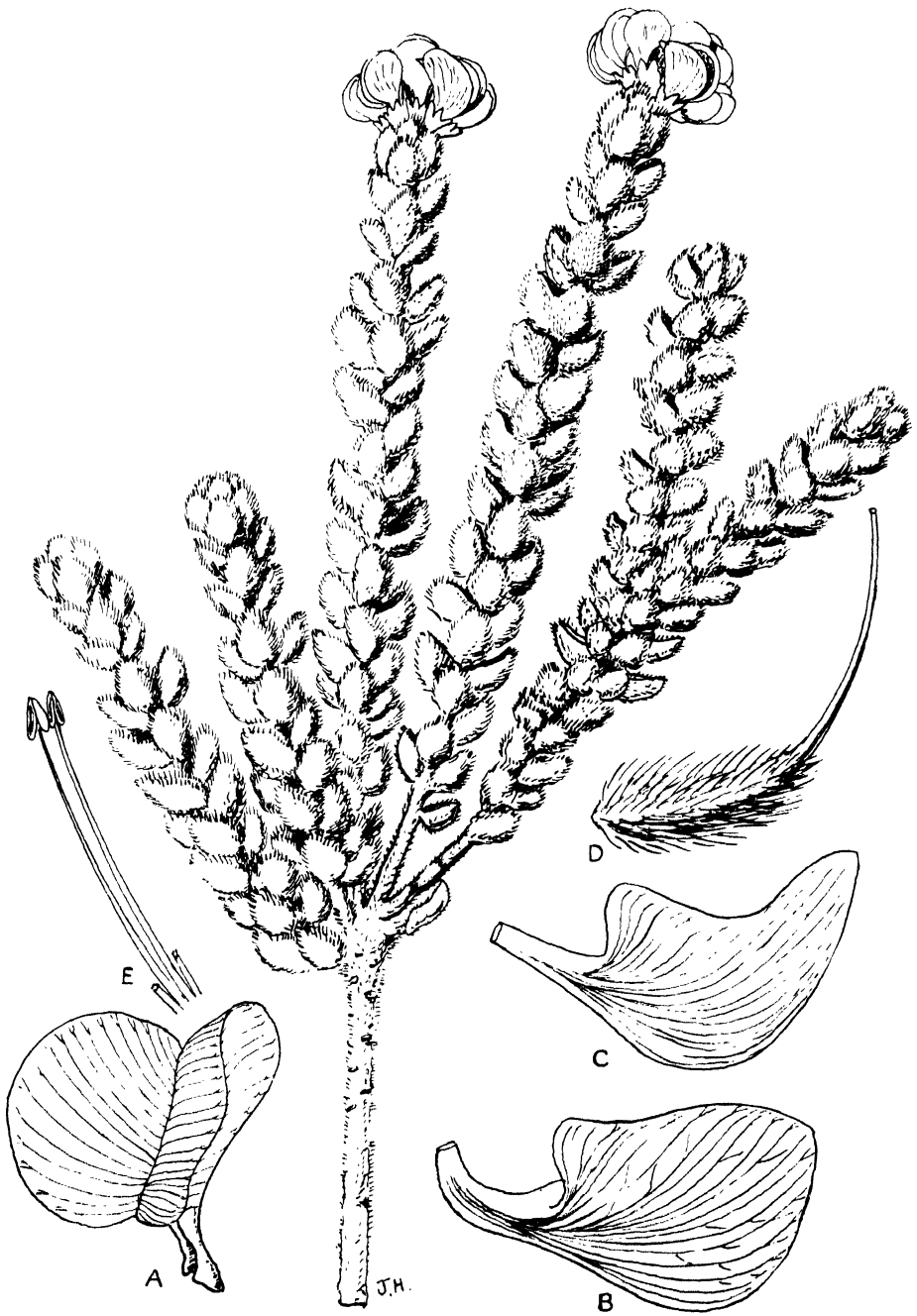
ACEAE) (No. 310), with small acicular leaves and dense panicles of small globose capitula; *Podalyria argentea* Salisb. (PAPILIONACEAE) (No. 311), a beautiful shrublet 1½ ft. high with simple obovate leaves and pink flowers; *Lachnaea eriocephala* Linn. (THYMELAEACEAE) (No. 312), with pink bracts and white, silky-hairy flowers; this species is endemic in this area; *Psoralea aphylla* Linn. (PAPILIONACEAE) (No. 313), a Spartium-like legume with subulate reduced leaves and pale mauve-blue and white flowers; a peculiar woody crucifer, *Heliophila scoparia* Burch. (No. 314), a shrublet 1½ ft. high, with linear leaves, pink flowers, and the young fruits purple; this ranges from the Cape Peninsula Mountains to the Cederbergen and to Caledon; *Priestleya reflexa* (Thunb.) Druce (No. 319), another simple lanceolate-leaved Papilionaceous plant with small clusters of pale lemon-yellow flowers, and a second species, *P. latifolia* Benth. (No. 323), with broadly elliptic silky leaves and pale yellow axillary flowers. Two species of LILIACEAE, representing an ancient group of the family with ebracteate flowers, were collected here; these are *Dipidax punctata* (Mill.) Hutch. (*D. ciliata* Baker) (No. 324), with spikes of white flowers and brown anthers, and *Wurmbea spicata* (Burm.) Dur. & Schinz, var. *purpurea* (No. 325), with spikes of blackish-purple flowers and yellow anthers. A handsome Composite flowering shrub was *Printzia polifolia* (Thunb.) Hutch. (*P. Bergii* Less.), with pale mauve-blue rays, and nearby no less than three species of orchids, *Pterygodium catholicum* (Linn.) Swartz, with two leaves and three to five green flowers; *Disperis capensis* Thunb. (No. 332), with one or two narrowly lanceolate leaves and a solitary greenish-white flower with a long acute spur, and *Disperis circumflexa* (Linn.) Dur. & Schinz (No. 333), with second spikes of small green flowers.

The next day (10th September), after conveying Dr. Marloth to the station, I went with a "boy", kindly supplied by my hostess, up a ravine about 4 miles north¹ of Sir Lowry's Pass. The slopes were covered with numerous boulders, among which were clumps of *Lobelia pinifolia* Linn. (LOBELIACEAE), and the woody *Viola decumbens* Linn. f. (VIOLACEAE) (No. 341), and here I was delighted to find a rare and local endemic Papilionaceous plant, *Priestleya vestita* (Thunb.) DC. (No. 339). It is found only at Sir Lowry's Pass, and is a weird plant with very concave orbicular imbricate leaves and terminal clusters of yellow flowers. Besides Thunberg, Burchell also collected it, and I give his remarks as an example of his excellent field notes:—

"8213. Frutex erectus, 5 ped. Rami pauci. Folia maxime concava, patula, imbricata, nervis (contra lucem visa) 3 diaphanis. Stamina 10, distincta.--In saxosis."

At the top of the pass Mrs. Solly pointed out to me where the old road crossed the mountains, and I was thrilled to realise that I had my feet planted on a track over which Thunberg, Masson, Burchell, and others had passed. On the old road were numerous examples of *Euryops rupestris* Schltr. (COMPOSITAE) (No. 340), a low gnarled shrublet with tripartite leaves, and small yellow capitula on slender

¹ Plants collected: No. 336, *Cyclopia genistoides* R. Br. (PAPILIONACEAE); 337, *Hippia gracilis* Less. (COMPOSITAE); 338, *Gnidia pinifolia* Linn. (THYMELAEACEAE).



Priestleya vestita (Thunb.) DC. (PAPILIONACEAE); a weird plant-form with bare slender stem 5 ft. high and yellow flowers, from Sir Lowry's Pass.

A, standard; B, wing, and C, keel petals; D, pistil; E, two of the free ten stamens.

peduncles. A pretty blue-flowered violet with linear-acicular leaves was *Viola decumbens* Linn. f. (No. 341).

The mountains to the north¹ of Sir Lowry's Pass yielded further material for the presses, among which a Papilionaceous climber was conspicuous, *Fagelia bituminosa* DC. (No. 350), with yellow striped petals, a plant of restricted distribution, ranging only from the Cape Peninsula to Mitchell's Pass. Creeping in the undergrowth was *Osteospermum ciliatum* Berg. (COMPOSITAE) (No. 351), with slender branches and small heads with yellow rays, and among the bushes a straggling *Indigofera*, *I. coriacea* Ait. var. *alopecuroides* Harv. (PAPILIONACEAE) (No. 352). A handsome *Erica*, *E. exsurgens* Andr. (ERICACEAE) (No. 353), grew near, with long acicular leaves and curved tubular flowers about 2.5 cm. long. A shrub 3 ft., with orange-yellow Papilionaceous flowers, was *Aspalathus ciliaris* Linn. (PAPILIONACEAE) (No. 354), a larch in miniature in general appearance. Another very handsome Composite was *Euryops abrotanifolius* DC. (No. 355), a shrub 3½ ft., with large yellow squat flower-heads about 5 cm. in diameter. Near a stream was a tall Composite, *Othonna parviflora* Linn. (No. 356), with spatulate leaves and panicles of small yellow flower-heads, and in masses a willow-like *Leucadendron*, *L. strictum* R. Br. (PROTEACEAE) (No. 359), the female with striking "cones" of closely imbricate truncate bracts. Lining the course of the stream in the more level places was here and there a small "forest" of the tall chrysanthemum-like *Osmitopsis asteriscoides* L. (COMPOSITAE), with white ray-flowers and grey-green foliage. After the recent rains the water rushed refreshingly in the deep, narrow gully. On the flatter parts above the stream were several species of *Erica* in full bloom, mainly with pink flowers, the herbage consisting of various kinds of RESTIACEAE, which in these parts replace the grasses. Near the stream was a continuous carpet of *Aster reflexus* Linn. (COMPOSITAE) (No. 477), with broad reflexed leaves. The remainder of the plants collected are enumerated below.²

Next day (11th September) with Mrs. Solly I visited the grounds of the Dynamite Factory of the De Beers Company on the shores of False Bay. It was necessary to sign an indemnity form absolving the company from responsibility for any accident which might occur,

¹ Plants collected: No. 342, *Euphorbia erythrina* Link (EUPHORBIACEAE); 343, *Coleonema juniperinum* (Spreng.) Sond.* (RUTACEAE); 343 bis, *Penaca mucronata* Linn. (PENAEACEAE); 344, *Chytia alaternoides* Linn. (EUPHORBIACEAE); 345, *Homeria collina* Vent. (IRIDACEAE); 346, *Leucadendron adscendens* R. Br. (PROTEACEAE); 347, *Berzelia lanuginosa* Brogn. (BRUNIACEAE); 348, *Erica Plukenetii* Linn. (ERICACEAE); 349, *Lobelia pinifolia* Linn. (LOBELIACEAE); 357, *Agathosma ciliata* Link. (RUTACEAE); 358, *Gnidia oppositifolia* Linn. (THYMELAEACEAE); 360, *Hermannia hyssopifolia* Linn. (STERCULIACEAE).

² No. 473, *Geissorhiza excisa* Ker. (IRIDACEAE); 474, *Pterygodium catholicum* (Linn.) Sw. (ORCHIDACEAE); 475, *Gazania rigens* Gaertn. (COMPOSITAE); 475a, *Morea angusta* Gawl. (IRIDACEAE); 476, *Othonna ciliata* Linn. (COMPOSITAE); 478, *Oedera capensis* (Linn.) Druce (COMPOSITAE); 479, *Serruria Kraussii* Meisn. (PROTEACEAE); 480, *Lobelia tomentosa* Linn. f. (LOBELIACEAE); 481, *Ixia micrandra* Bak. (IRIDACEAE); 482, *Geissorhiza secunda* Ker (IRIDACEAE); 483, *Muraltia phyllicoides* Thunb. (POLYGALACEAE); 636, *Leucadendron glabrum* R. Br. (PROTEACEAE), coll. on Mrs. Solly's farm.

* Although the earliest name for this plant is *Diosma virgata* G. F. W. Mey. (1824), this specific name cannot be used under *Coleonema* because there already exists the validly published *Coleonema virgatum* E. & Z., a synonym of *C. pulchrum* Hook.

and to give up at the gate matches, pipes, etc. One felt guilty of even the nails in one's boots, in case a spark might set things going, and it gave me a rather queer feeling to be so near such dangerous material. The botanical results from the enclosed property, however, were very disappointing, and I was not sorry to leave.



Aster fruticosus Linn. (COMPOSITAE) and *Protea mellifera* Thunb. (PROTEACEAE), at Gordon's Bay.

At this point I parted from my kind hostess and proceeded alone with the car to Gordon's Bay, at the foot of the Hottentot's Holland mountains. In the afternoon I wandered alone up the slopes of the mountains behind the village and collected some living plants of Aloe for Kew. My descent with these heavy specimens towards dusk was hastened not only by several falls among the rough stones, but also by

the barking of a troop of baboons which had come uncomfortably close for a visitor unaccustomed to their ways and fresh from a London suburb. I had gathered a few other specimens which for some reason or other I failed to note in my field books, and which remained unnumbered.

That night I learned from the *Cape Argus* that someone had for disposal a Citroën four-seater car at a low figure, and next morning I drove to Somerset West and enquired at the Post Office as to the identity of the advertiser. Having obtained this, I called and saw the owner, and, after testing the car for a few miles, agreed to hire it at a figure which would be only about a quarter of the expense of the Government car, which was clearly too dear to run. Well satisfied with my new venture, which later proved to be a sound and economical transaction—for the car carried me well right round the Union—I returned to Cape Town via the Cape Flats. On the way I encountered a real “sou-easter”, which rocked the car in exposed places, and I could imagine the dreadful sandstorms which prevailed here before the dunes were colonised, and fixed by the introduced Australian Acacias. Although something of an “eyesore” to a botanist, they are admirable for holding the sand, and have rendered possible the cultivation of these wastes, giving quite a number of people a livelihood from what was previously a “desert”.

A few days were now spent in making arrangements about the car, insurance, overhaul, and attending to plant presses.

Excursion to Tulbagh Flower-Show and Waterfall

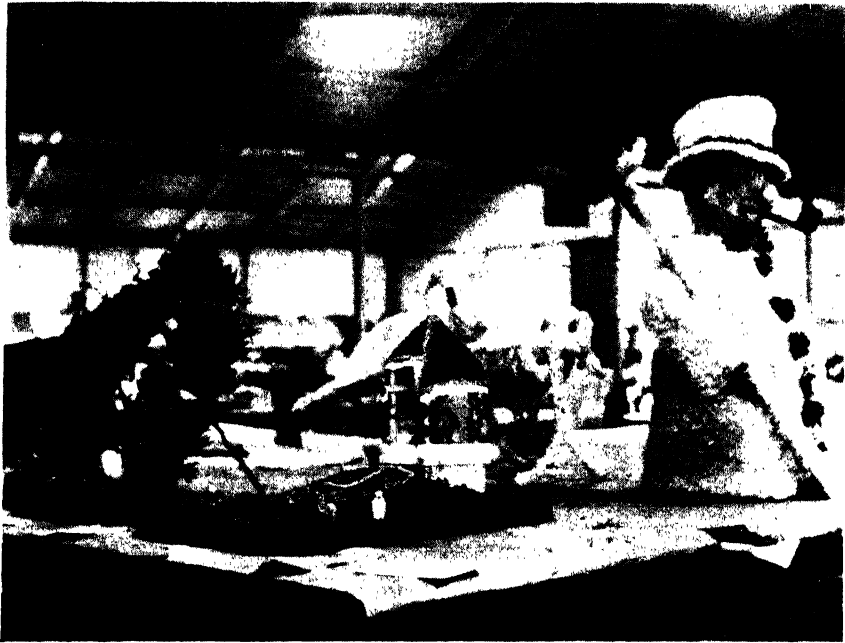
On Friday afternoon (14th September), Mr. Pillans and I entrained at Cape Town for Tulbagh, where Mr. Pillans was due to judge at the local flower-show. We arrived at Tulbagh Road Station at nine o'clock, and hired a car to take us to the Tulbagh Hotel in the town, which is about four miles from the station.

The weather next morning was perfect, and whilst judging took place I botanised around the model little town, with its clean and spacious streets. The flower-show was interesting to me, since it was so very different from those at home, and mainly devoted to wild flowers.

Here, for example, are a few items in the prize list, to show the contrast between a South African and a British Flower Show:—

	1st Prize.		2nd Prize.	
	£	s.	£	s.
1. Best collection of Tulbagh Wild Flowers (PROTEACEAE excluded)	6	0	4	0
2. Best and largest collection of PROTEACEAE	2	0	1	0
3. Best and largest collection of Gousblomme (various COMPOSITAE)	15		10	
4. Best collection of LILIACEAE and IRIDACEAE— <i>e.g.</i> , Naaltjies, Babiana, Fluweeltjies, Uiltjies, Kolossies, Gladiolus, Pypies, Kalkoentjies, etc.	1	15	1	5

The prize collection of PROTEACEAE on this occasion is shown in the accompanying photograph (p. 97).



Samples of exhibits at the Tulbagh Flower Show.

*Top, weird figures and designs made from the bracts of Helichrysum ;
bottom, vase of Leucospermum and Protea.*



Another exhibit at the Tulbagh Flower Show.
Prize collection of PROTEACEAE.

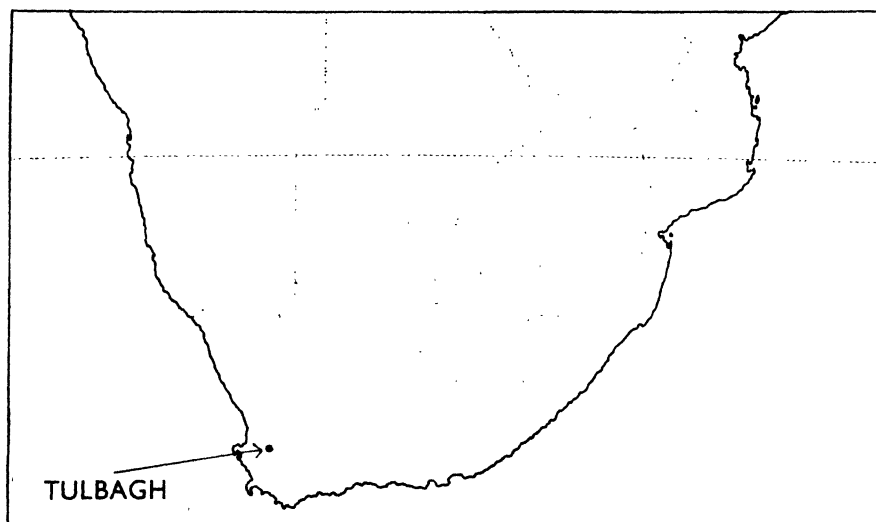
In the afternoon we visited the garden of Mr. du Klerk, an enthusiastic grower, in which a great range of colour in *Arctotis acaulis* and in *Morea Pavonia* was observed. Afterwards we botanised¹ in the veld beyond the town, over the river to the left of the golf course.

¹ Plants collected near Tulbagh: Nos. 361, *Homeria miniata* Vent.; 362, *Homeria collina* (Thunb.) Vent. (IRIDACEAE); 363, *Romulea rosea* Eckl. (IRIDACEAE); 364, *Aster tenellus* Linn. (COMPOSITAE); 365, *Senecio latus* DC. (COMPOSITAE); 366, *Senecio scapiflorus* (L'Herit.) C. A. Smith (COMPOSITAE); 367, *Sutera linifolia* O. Ktze. (SCROPHULARIACEAE); 368, *Senecio latus* DC.; 369, *Selago fruticulosa* Rolfe; 370, *Senecio angustifolius* Willd.; 371, *Hermannia tenuifolia* Sims (STERCULIACEAE); 372, *Hermannia alnifolia* Linn.; 373, *Heliophila chamaemelifolia* Burchell (CRUCIFERAE); 374, *Polycarena rariflora* Benth. (SCRO-

I was much struck by the vast quantity of "tulps", *Homeria collina* (Thunb.) Vent., and a conspicuous plant was a species of *Euryops*, *E. longipes* DC. (No. 379), a small shrub up to 2½ ft., with yellow flower-heads.

From Tulbagh we decided to visit the Tulbagh Waterfall, a classical hunting ground for plants, and after depositing our bags at the station we proceeded by car.

The waterfall is very pretty, and we obtained a rich harvest of typical "Cape" plants, which are set out in systematic order on p. 103. Among the many striking species above the Waterfall were *Phyllica spicata* Linn. f. (RHAMNACEAE) (No. 407), a distinct species with ovate-cordate leaves woolly below and short spikes or heads of flowers,

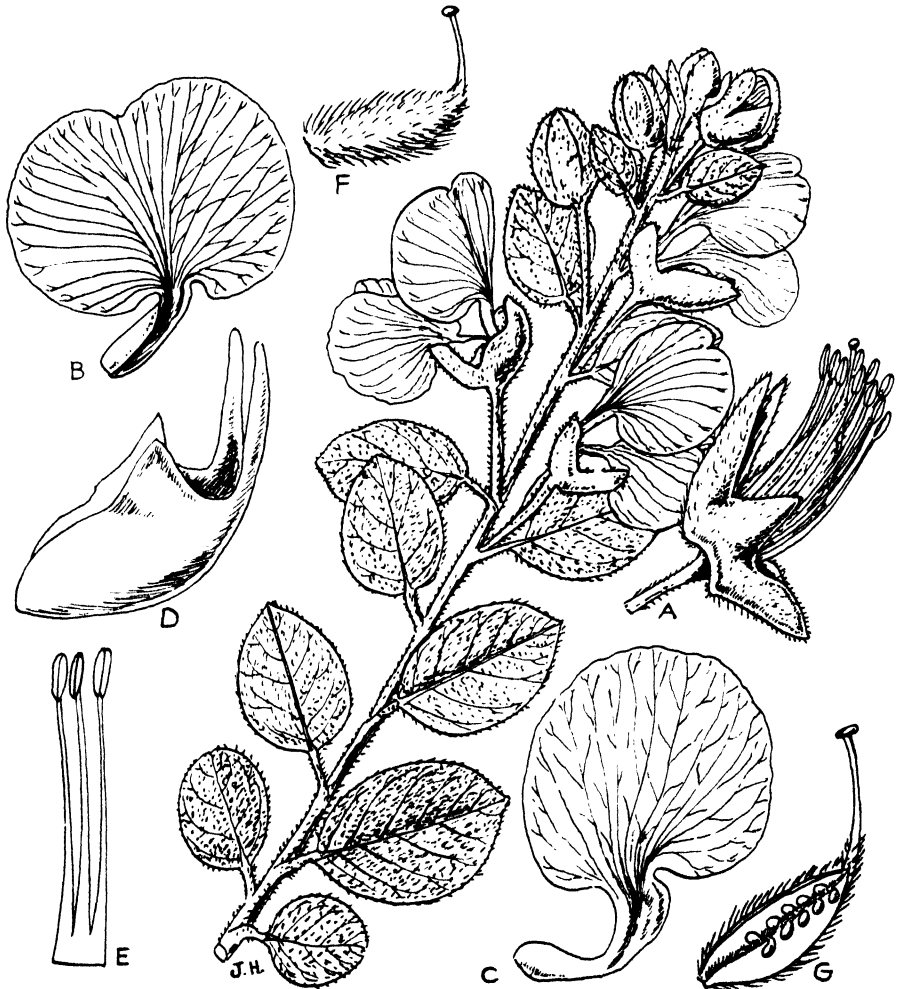


the fruits glabrous but crowned with a woolly calyx; *Lobostemon trichotomus* DC. (BORAGINACEAE) (No. 409), 1-1½ ft., with pale-blue flowers and narrow leaves. Perhaps the most striking plant to me was a woody Crucifer, *Brachycarpaea flava* (Linn. f.) Druce, var. *purpurascens* Hutch. (No. 410), a beautiful shrub 2½ ft. high, with the habit of *Spartium junceum*, Spanish Broom, and with very distinct didymous beaked fruits. The flowers vary from white to light purple-pink, or even yellow, from which fact no doubt De Candolle gave it the very suitable name of *B. varians*. But under International Rules this name is invalid, because the plant was first described by the younger Linnaeus as *Heliophila flava*.¹ It ranges from Clanwilliam to Tulbagh, and was plentiful in the mountains above the water-

PHULARIACEAE); 375, *Zaluzianskya villosa* F. S. Schmidt (SCROPHULARIACEAE); *Hypoxis aquatica* Linn. (HYPOXIDACEAE); 378, *Erica paniculata* Linn. (ERICACEAE); 379, *Euryops linifolius* DC. (COMPOSITAE); 380, *Geissorrhiza hirta* (Thunb.) Ker (IRIDACEAE); 381, *Aster Bergerianus* Harv. (COMPOSITAE); 382, *Cotula bipinnata* Thunb. (COMPOSITAE); 383, *Satyrrium erectum* Swartz (ORCHIDACEAE); 384, *Asclepiadaceae*, specimen lost; 385, *Eustegia filiformis* Schult. (ASCLEPIADACEAE); 386, *Agathosma ambigua* Sond. (RUTACEAE).

¹ Linn. f. *Suppl.*, 297 (1781).

fall. Here also I found one of my own species, *Serruria Knightii* Hutch. (PROTEACEAE) (No. 411), a shrub with deeply cut leaves with acicular segments and clusters of small silky flowers. A very hairy-leaved Erica-like plant was *Acrostemon incurvus* Benth. (ERICACEAE) (No. 412), with balls of pink flowers, but with only four stamens.

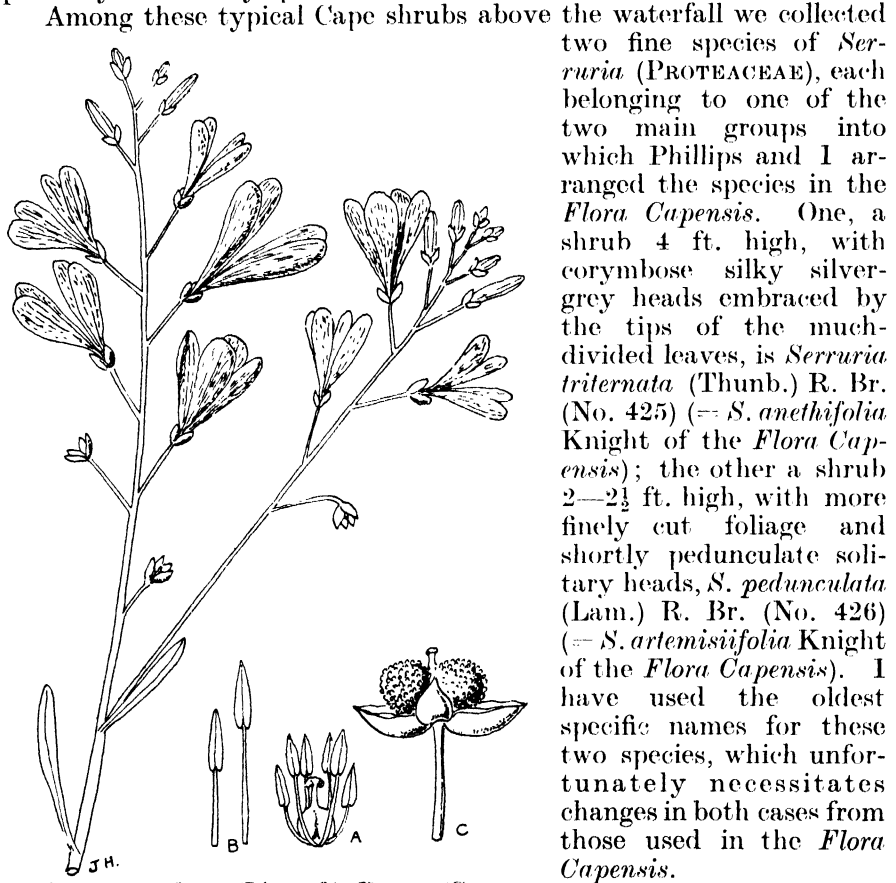


Podalyria canescens E. Mey. (PAPILIONACEAE), a beautiful shrub from Tulbagh Waterfall; flowers mauve.

A, flower with petals removed; B, standard petal; C, wing petal; D, keel petals; E, stamens; F, pistil; G, pistil opened out.

Phylica plumosa Thunb. var. *horizontalis* Sond. (RHAMNACEAE) (No. 415) was also collected here by Ecklon in 1835; it is a shrub 3½ ft. high, with dense acicular leaves, the upper ones villous-plumose. A beautiful shrub 6 ft. high, with silvery nearly orbicular simple leaves and pretty mauve flowers, was *Podalyria canescens* E. Mey. (PAPILIONACEAE) (No. 420). Another species of *Phylica* (No. 423) proved to be *P. fulva*

Eck. & Zeyh.,¹ an erect shrub up to 7 ft. high. This was regarded as a variety of *P. excelsa* Wendl. (var. *buxifolia* Sond.) in the *Flora Capensis*, but I think it is distinct and does not range far from Tulbagh Waterfall, where it was first gathered about 100 years ago by Ecklon and Zeyher, probably in the very spot in which we found it.



Brachycarpaea flava (Linn. f.) Druce (CRUCIFERAE); flowers varying from white to light purple-pink or yellow; from the Tulbagh Waterfall.

A, stamens and pistil; B, long and short stamens; C, calyx and fruit.

position, placed by Bentham and Hooker at the end of the ONAGRACEAE as a "genus anomalum", but by Harvey and later by Engler in the SAXIFRAGACEAE. As I have made a detailed study of the relationships of the families of flowering plants,² I may perhaps give my own opinion after careful comparison. *Montinia* undoubtedly

the waterfall we collected two fine species of *Serruria* (PROTEACEAE), each belonging to one of the two main groups into which Phillips and I arranged the species in the *Flora Capensis*. One, a shrub 4 ft. high, with corymbose silky silver-grey heads embraced by the tips of the much-divided leaves, is *Serruria triternata* (Thunb.) R. Br. (No. 425) (= *S. anethifolia* Knight of the *Flora Capensis*); the other a shrub 2—2½ ft. high, with more finely cut foliage and shortly pedunculate solitary heads, *S. pedunculata* (Lam.) R. Br. (No. 426) (= *S. artemisiifolia* Knight of the *Flora Capensis*). I have used the oldest specific names for these two species, which unfortunately necessitates changes in both cases from those used in the *Flora Capensis*.

Another very interesting plant collected was *Montinia caryophyllacea* Thunb. (*M. acris* L. f.) (No. 414), a monotypic genus of rather doubtful

¹ Ecklon & Zeyher *Enum.* 134 (1834). Other collectors of this species: Axellfarm, Hex River Mts., *Rehmann* 2711 (1875–80). Near Artois, Tulbagh, Mar 1886, *Bolus* 9189. New Kloof, Tulbagh, Feb. 1896, *Schlechter* 7493.

² Hutchinson, *The Families of Flowering Plants* (vol. i, 1926; vol. ii, 1934), Macmillan & Co.

finds its nearest affinities in the family ESCALLONIACEAE, formerly included in the SAXIFRAGACEAE. ESCALLONIACEAE are found mainly in the Southern Hemisphere, and there is only one other genus of the family in South Africa—namely, *Choristylis*. I give a sketch of *Montinia*, whose flowers are dioecious and seeds winged.

A very striking plant was *Osteospermum junceum* Berg. (COMPOSITAE) (No. 399), a lanky shrub 8 ft. high, with spatulate-obovate toothed leaves and yellow rays, the peduncles and involueral bracts partially



Montinia caryophyllacea Thunb. (ESCALLONIACEAE), the systematic position of which is discussed (see p. 100).

A, male flower from above, showing petals, stamens and rudimentary ovary; B, stamen; C, calyx; D, styles; E, fruits; F, seed.

covered with white wool. Another less showy Composite was *Othonna rigida* DC.—No. 403, 2–3 ft. high, with narrowly oblanceolate entire leaves, narrowed to the base, reduced as a synonym of *O. amplexicaulis* Thunb. by Harvey in the *Flora Capensis* (3 : 335), but from which it seems separable by the leaves not being amplexicaul at the base. It occurs at Tulbagh and Paarl, in rather moist areas, whereas *O. amplexicaulis* appears to prefer a drier area from Clanwilliam through the Little Karoo to Oudtshoorn as far as the Vanstaadens Mountains.

Near the Tulbagh Waterfall grows one of South Africa's rarest woody plants. This is *Ixianthes retzioides* Benth., one of the few ligneous



Ixianthes retzioides Benth. (SCROPHULARIACEAE); flowers yellow; a rare woody plant found only near the Tulbagh Waterfall.

SCROPHULARIACEAE. At one time it was thought to be extremely rare, and so it is comparatively, but in 1929 an American botanist, Miss Adele Lewis Grant, found it abundant in the stream-bed about a mile above the waterfall. It flowers in December, and was not therefore in evidence at the time of our visit. In the Kew Herbarium there is a specimen collected by J. Thode (No. 2050) labelled as being found in the Cederbergen, but the locality may not be correct.

It is a shrub up to 7 ft. in height, with strict branches, linear remotely dentate leaves, and axillary yellow bilabiate flowers, the pedicels with a pair of narrow bracts in the middle. I give a sketch of this fine species adapted from the figure in the *Botanical Magazine* (t. 7409).

List of Plants Collected above the Tulbagh Waterfall,

16th September, 1928

LIGNOSAE (WOODY DICOTYLEDONS)

- PAPILIONACEAE—*Priestleya rotundifolia* (Eck. & Zeyh.) Walp. (No. 394): shrub 4 ft., with simple rounded-elliptic mucronate leathery softly tomentose leaves, with creamy flowers hidden among the leaves. *Podalyria canescens* E. Mey. (No. 420) (see p. 99). *Aspalathus nervosa* E. Mey. (No. 387): shrub up to 5 ft. with fascicles of small acicular hairy leaves, and solitary subsessile pale-yellow flowers.
- ESCALLONIAEAE—*Montinia caryophyllacea* Thunb. (*M. acris* L. f.) (see note and figure on p. 101) (No. 414).
- BRUNIACEAE—*Pseudobaeckia pinifolia* (Brongn.) Nicolson (No. 422): a rutaceous-like shrub with narrow smallish leaves resembling the small phyllodes of an *Acacia*; flowers small, white, in small bracteate panicles.
- THYMELAEACEAE—*Gnidia oppositifolia* Linn. (No. 417): slender shrublet with imbricate sessile broadly lanceolate small leaves and heads of cream flowers. *Lachnaea globulifera* Meisn. (No. 398): virgate shrublet 2 ft., with slender branches and small acicular leaves; flowers in sessile heads white to pink. *Passerina glomerata* Thunb. (No. 416): shrublet with numerous small branchlets and small ericoid leaves, and sessile clusters of small reddish flowers.
- PROTEACEAE—*Serruria Knightii* Hutch. (No. 411) (see note, p. 100). *S. triternata* (Thunb.) R. Br. (No. 425) (see note, p. 100). *S. pedunculata* (Lam.) R. Br. (No. 426) (see note above). *Protea rosacea* Linn. (No. 470) (see figure, p. 117). *Leucadendron decorum* R. Br. (Nos. 472, 484): branchlets softly hairy; male heads sessile, surrounded by oblanceolate yellow bracts; female cones glabrous, 4·5 cm. long.
- ERICACEAE—*Erica tenuis* Salisb. (Nos. 396, 397): graceful shrub with numerous small branchlets; leaves glabrous; flowers very small, white. *E. placentaeflora* Salisb. (No. 401): 2½ ft., branchlets very short, with few glabrous leaves; flowers calycine, pink, styles long-exserted. *E. cristaeflora* Salisb. (No. 402): flowers very fine pinkish-red, small. *E. calycina* Linn. (No. 424): pedicels hirsute with short white hairs; flowers white, small.
- RHAMNACEAE—*Phyllica fulva* Eck. & Zeyh. (No. 423) (see note, p. 99). *P. plumosa* Thunb. var. *horizontalis* Sond. (No. 415) (see note, p. 99). *P. spicata* Linn. f. (No. 407) (see note, p. 98).
- RUTACEAE—*Coleonema juniperinum* (Spreng.) Sond. (No. 392): shrublet 2 ft., with numerous slender branchlets and small ericoid leaves; flowers solitary, axillary, white. *Agathosma variabilis* Sond. (No. 404): shrublet 1 ft., intricately branched; leaves lanceolate, keeled, ciliate; flowers in globose clusters, white. *Diosma aspalathoides* Lam. (No. 408): shrublet 2 ft.; leaves acicular, acute, gland dotted, glabrous; flowers cymulose, white.
- ANACARDIACEAE—*Heeria argentea* (Thunb.) Engl. (No. 471): shrub up to 15 ft.; leaves simple, oblong-oblanceolate, emarginate, with numerous nerves, glaucous below; fruits obliquely ovoid, glabrous.

HERBACEAE (HERBACEOUS DICOTYLEDONS)

CRUCIFERAE—**Brachycarpea flava** (Linn. f.) Druce, var. **purpurascens** Hutch. (No. 410) (see note on p. 98 and figure on p. 100).

CAMPANULACEAE—**Cyphia digitata** Willd. (No. 391): herbaceous twiner; leaves trifoliolate, leaflets narrowly lanceolate; flowers solitary, buff-coloured.

COMPOSITAE—**Helichrysum odoratissimum** Less. (No. 421): tall scrambler, 4 ft.; leaves amplexicaul, linear, woolly below; heads small, with pale-yellow shining bracts. **Senecio pinnulatus** DC. (No. 405): leaves pinnatipartite, glabrous; rays yellow. **Othonna rigida** DC. (No. 390): in shady places; slender herbaceous stems; leaves ovate-orbicular, deeply cordate at the base and amplexicaul; heads yellow, radiate, on long slender peduncles. **Euryops rupestris** Schlechter (No. 389): on cliffs; shrublet 1 ft. high; leaves pinnatipartite into narrow segments; heads yellow, radiate, on very slender peduncles. **Osteospermum junceum** Berg. (No. 399) (see note, p. 101). **O. polygaloides** Linn. (No. 388): shrub, 2½ ft.; leaves narrowly linear-oblancoolate, keeled; heads yellow, shortly pedunculate; peduncle setulose-scabrid. **Arctotis angustifolia** Linn. (No. 418): stems ascending, slender; leaves narrow, dentate, setulose above, white-woolly below; heads with cream ray-flowers. **Ursinia chamomillifolia** N.E. Br. (No. 413): ray-flowers yellow, red below. **U. chrysanthemoides** Harv. (No. 419): branches creeping, rays white.

BORAGINACEAE—**Lobostemon glaucophyllus** Buek (No. 400): shrubby, 2 2½ ft.; leaves scattered, narrowly oblong-lanceolate, glabrous except the slightly scabrid margin; flowers pale blue, in short cymes. **L. trichotomus** DC. (No. 409): 1-1½ ft.; leaves imbricate, narrowly oblanceolate, appressed-pubescent; flowers in terminal clusters, pale blue (see also note, p. 98).

MONOCOTYLEDONS

IRIDACEAE—**Watsonia spectabilis** Schinz (No. 393): 1½ ft.; leaves very narrow; flowers few, red.

HYPOXIDACEAE—**Hypoxis gracilipes** Schltr. (No. 395): leaves glabrous, slightly falcate; peduncles 2-flowered; flowers yellow.

Excursion to Paarl

On Wednesday, 19th September, I went to Paarl by train and botanised at the foot of the Paarlberg,¹ a huge, almost bare mass of rock. It was rather a disappointing day, however, as I was alone and not feeling very well. Among the more interesting plants collected was *Drosera acaulis* Linn. (DROSERACEAE) (No. 454) (the *D. pauciflora* of Banks ex DC.). Great variation was observed in the length of the peduncle, from almost nothing, as described by Linnaeus, to 15 cm. long. It is a handsome species, with large flowers as big as a small *Cistus*. *Lotononis involucrata* Benth. (PAPILIONACEAE) (No. 459) was a creeper on the ground with subsessile trifoliolate long-pilose leaves and clusters of yellow flowers. *Adenandra serpyllacea* Bartl. (No. 464), a Rutaceous herb 1 ft. high, had beautiful white flowers, red

¹ Other plants collected: No. 455, *Pterygodium catholicum* (Linn.) Swartz (ORCHIDACEAE); 456, *Hermannia alnifolia* Linn. (STERCULIACEAE); 457, *Microlooma tenuifolium* (Linn.) K. Schum. (ASCLEPIADACEAE); 458, *Indigofera gracilis* Spreng. (PAPILIONACEAE); 460, *Osteospermum spinosum* Linn. (COMPOSITAE); 461, *Leucospermum grandiflorum* R. Br. (PROTEACEAE); 461, *Ursinia crithmoides* Poir. (COMPOSITAE); 466, *Sparaxis grandiflora* Ker. (IRIDACEAE); 467, *Hippia frutescens* Linn. (COMPOSITAE); 468, *Pterygodium catholicum* (Linn.) Swartz; 469, *Lewcadendron lanigerum* Buek (PROTEACEAE)—Plants numbered 470-472 collected at Tulbagh Waterfall (see p. 103).



Dimorphotheca pluvialis DC., near Somerset West; towards sundown the field becomes green again, owing to the closing of the flower-heads, a feature of many other South African COMPOSITAE.

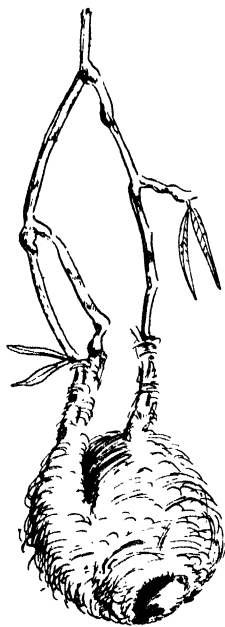
beneath. No. 465 proved to be rather a puzzle to determine. I found only a solitary specimen, which turned out to be *Melasphaerula graminea* Ker (IRIDACEAE).

To Caledon

Thursday, 20th September, was devoted to plant-pressing and writing up notes, and the next day I accompanied Mr. Pillans by car to the Caledon Flower Show. We stopped at a grove of conifers (planted) near Somerset West, and close by was a beautiful field (see photograph) covered with *Dimorphotheca pluvialis* DC., which during the day is a sheet of white, but in late afternoon is green, owing to the closing of the flower-heads, a characteristic of many South African COMPOSITAE. Below I give a list of the plants gathered on the way, though we were more intent on visiting the famous flower-show, and not so much on collecting.

On the way across the Cape Flats we stopped near Faurie to collect two species, *Sparaxis grandiflora* Ker (IRIDACEAE) (No. 497), a well-

E 2



Weaver bird's nest on the road to Caledon.



[Photogr. : T. B. Pole Evans, Nor. 1934.]

Leucospermum nutans (R. Br.) (PROTEACEAE), between Stanford and Caledon.

known greenhouse plant which was interesting to see in a wild state, and an Orchid, *Corycium orobanchoides* Swartz (No. 498). At the top of Sir Lowry's Pass we also paused to gather *Muraltia conferta* DC. (POLYGALACEAE) (No. 494); *Erepsia inclaudens* N.E. Br. (FICOIDACEAE) (No. 495); *Aristea africana* Hoffmsg. (IRIDACEAE) (No. 496); *Erica ustulescens* Guth. & Bolus (ERICACEAE); *Raspalia microphylla* Brogn. (BRUNIACEAE) (No. 504), and *Hydrocotyle triloba* Thunb. (UMBELLIFERAE) (No. 505). It was interesting to see at the very top of the Pass plants of the remarkable Composite genus *Oldenburgia*, though not in flower. It is, veritably, a tree in miniature.

East of the Bot River¹ we gathered a fine species of *Malvastrum* (No. 489), which I have failed to determine as any known species, and I have described it below as *M. riparium* Hutch.,² as it grew on the

¹ Collected east of the Bot River : No. 485, *Hippia frutescens* Linn. (COMPOSITAE); 486, *Podalyria cuneifolia* Vent. (PAPILIONACEAE); 487, *Hermannia hyssopifolia* Linn. (STERCULIACEAE); 488, *Struthiola Mundtii* Eckl. ex Meisn. (THYMELAEACEAE); 490, *Sutera revoluta* O. Kuntze (SCROPHULARIACEAE); 491, *Aster filifolius* Vent. (COMPOSITAE); 501, *Struthiola Mundtii* Eckl. ex Meisn.; 503, *Royena hirsuta* Linn. (EBENACEAE).

² *Malvastrum riparium* Hutch. sp. nov.

Frutex virgatus, fere 2 m. altus, pube stellato ubique molliter indutus. Folia ovata vel ovato-orbicularia, 1.5-2 cm. longa et lata, crenato-dentata, basi trinervia vel subquinquenervia; petioli breves; stipulae foliaceae, ovatae, 3 mm. longae. Flores subsessiles, rosei, petalis basi maculatis; involucri bracteeae 3, foliaceae, 1 cm. longae, pilosae et multinervosae. Calyx turbinato-campanulatus, 1.3 cm. longus, extra et margine subsetoso-pilosus, lobis ovato-triangularibus acuminatis. Petala basi conspicue connata, late obovata, 1.5 cm. longa, ungue lato intra breviter hirsuta. Columna staminalis medio dense hirsuta. Ovarium depressum, breviter tomentosum; styli rami 12-14, ad medium connati, apice leviter clavati.

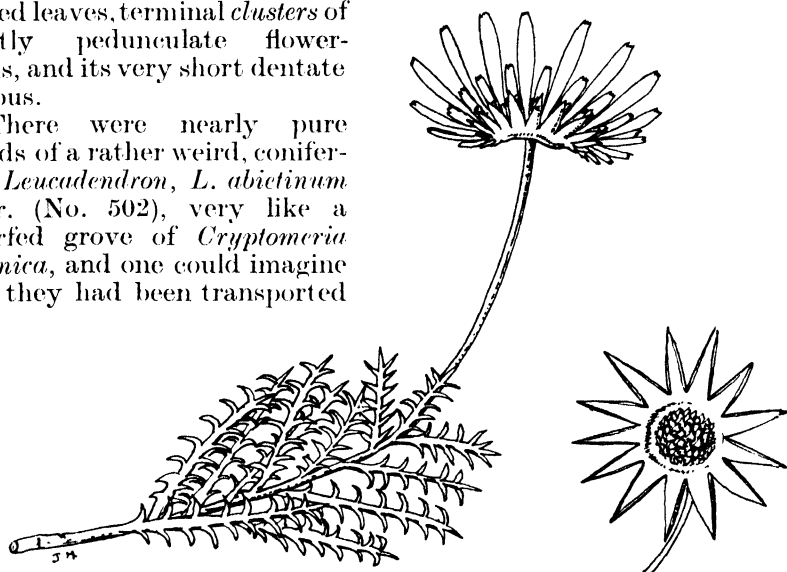
South Africa : near stream-bed east of Bot River, lanky shrub 4-5 ft., flowers pink, blotched at the base, 21st September, 1928, *Hutchinson* 489 (type in Kew Herbarium).

raised ground between small dried-up streams; it is a lanky shrub about 4 to 5 ft. high, with pink petals blotched at the base.

Near a stream-bed we were fortunate to again find the rare Crucifer (at least, it is very rare in herbaria), *Chamira cornuta* Thunb. (No. 492), which I have described on p. 84; it is recorded from Saldanha Bay, Simonsbay, and slopes near Smitwinkel and Chapman's Bay on the Cape Peninsula. A black-and-white sketch of this interesting species appears on p. 85.

Relbania squarrosa (L.) L'Hérit. (No. 499) is a common Composite shrub, with yellow ray-flowers, on the hills east of the Bot River. It is widely distributed in the drier parts from Clanwilliam to Humansdorp, and easily recognised by its obovate-spathulate recurved closely gland-dotted leaves, terminal clusters of shortly pedunculate flower-heads, and its very short dentate pappus.

There were nearly pure stands of a rather weird, conifer-like *Leucadendron*, *L. abietinum* R.Br. (No. 502), very like a dwarfed grove of *Cryptomeria japonica*, and one could imagine that they had been transported



Euryops speciosus Hutch. sp. nov. (COMPOSITAE), from Caledon Baths;
ray-flowers yellow, red below.

there by the Japanese, who are so clever at retarding large trees as miniatures.

By the roadside at Houw Hoek Pass we made a collection of *Cryptostemma Calendula* (Linn.) Druce¹ (No. 493), a prostrate herb in sand, with yellow ray-flowers. It is very like an *Arctotis*, but the genus differs in having the ray-flowers quite sterile (not producing achenes), and a pappus of several dry scales hidden among the woolly hairs which clothe the achene (see figure, p. 47). This species is extremely variable, both in habit and leaf-segmentation, being common on road-sides and waste places. The country hereabouts was very dry and barren, though Schlechter got many plants in the Pass.

The Caledon Baths Hotel is a big, comfortable place with medicinal hot springs, and next morning we visited the flower-show, where we saw many interesting native plants.

¹ This plant has had many names owing to its variability, but its final one seems to be *Cryptostemma Calendula* (Linn.) Druce, based on *Arctotis Calendula* Linn. *Sp. Pl.* 922 (1753). The *Flora Capensis* name, *C. calendulaceum* R. Br., is therefore invalid.

In the afternoon we botanised above the hotel, in company with Mr. Ross Frames, of Cape Town, a keen student and grower of the South African flora. We were fortunate to find what I take to be a distinct and undescribed species of *Euryops* gathered in this same place by Alexander Prior in October 1846. It has lain associated with *E. abrotanifolia* in the Kew Herbarium for many years, and I have described it below as *E. speciosus* Hutch. n. sp.¹ (No. 510), being a shrub

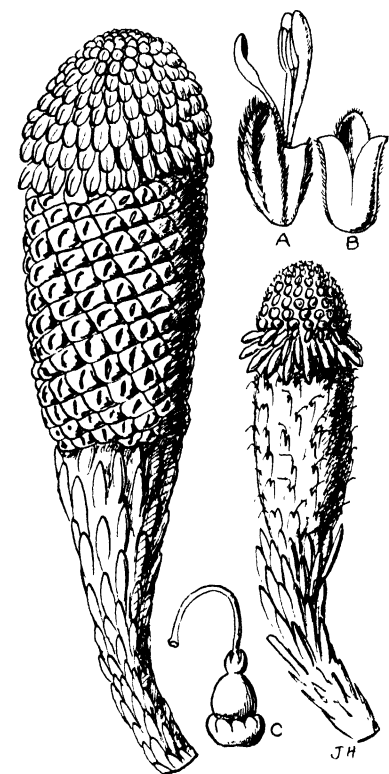
on rocks, with yellow ray-flowers, beautifully red below. The finding of this interesting plant proves that one is never sure what one is collecting in South Africa, and any plant may prove to be even a new, or at any rate a very rare, species.

Another interesting species recorded from near Caledon is *Mystropetalon Thomii* Harv., belonging to the family BALANOPHORACEAE, a fleshy plant about 6 in. high, parasitic, with scale-like leaves, the flowers in a dense thick spike, the males above, the females below; each male flower with a bilabiate perianth and only two stamens (see figure opposite).

Here is our small bag from above the Caledon Baths Hotel:—

Mimetes lyrigera Knight (PROTEACEAE) (No. 506), a shrub 3–4 ft. with silky flowers among the reddish bract-like leaves; *Ursinia crithmoides* Poir. (COMPOSITAE) (No. 507); *Osteospermum hispidum* Harv. (COMPOSITAE) (No. 508), a bush with strigillose-pubescent oblong leaves and yellow flower-heads; *Serruria Knightii* Hutch. (PROTEACEAE) (No. 509), shrub 1½ ft., finely dissected leaves, and dull white clusters of flowers; *Paranomus spicatus* (Berg.) O.

Kuntze (PROTEACEAE) (No. 511), leaves cut into fine segments; flowers pink, woolly; *Bartholina Burmanniana* (Linn.) Ker (No. 512), a little



Mystropetalon Thomii Harv. (BALANOPHORACEAE), a parasitic plant; grows near Caledon Baths.

A, male flower; B, calyx; C, female flower.

¹ *Euryops speciosus* Hutch. sp. nov.

Frutex 0·3 m. altus; rami crebre foliati. Folia pinnatipartita, ad 1·5 cm. longa, segmentis turgidis subteretibus glabris subacutis 4–5 mm. longis. Capitula terminalia, longe pedunculata, circiter 4 cm. diametro; pedunculi 4–5 cm. longi. Involucrum 1 cm. longum; bracteae ad medium connatae, anguste lanceolatae, apice puberulae, margine tenuiores. Flores radii supra flavi, infra intense rubri; lamina 2 cm. longa. Receptaculum profunde foveolatum, late ovoideum.

South Africa: Caledon Division; above Caledon Baths Hotel, on rocks, 22nd September, 1928, *Hutchinson* 510 (type in Kew Herbarium); *Alexander Prior*.

orchid with a solitary leaf and a solitary spider-like flower; *Arctotis scapigera* Thunb. (COMPOSITAE) (No. 513), prostrate lyrate radical leaves from a thick rootstock, and orange-yellow flowers; *Heliphila pilosa* Lam. (CRUCIFERAE) (No. 514), branches slender; leaves trifurcate; flowers pale blue; *Ursinia discolor* N.E. Br. (COMPOSITAE) (No. 515); *Ifloga seriphoides* (Berg.) Schltr. (COMPOSITAE) (No. 516), small fasciculate hoary leaves and elongated tail-like spikes of small flower-heads; *Aristea africana* (Linn.) Hoffmannsegg (*A. cyanea* Soland.) (IRIDACEAE) (No. 517); *Senecio pinnulatus* DC. (COMPOSITAE) (No. 518); *Gnidia setosa* Wikström. (THYMELAEACEAE) (No. 519).

On Sunday, 23rd September, we returned by road to Cape Town, via Genadendal, a weird place of mud houses and with plenty of water. Around the mission were some fine old exotic trees. The roads were very wet and slippery, and we came at length to the car of one of our friends lodged in a bank of earth at the roadside. Ours had a similar fate a short time afterwards. These are common occurrences for South Africans, however, who take them philosophically, and fellow motorists are always ready to stop and help. "Are you all right?" is the cry when they pass along and suspect you to be in difficulties.

Botanising at Llandudno, Cape Peninsula

On Wednesday, 26th September, I went with Mr. Pillans to visit Professor and Mrs. Compton at Llandudno, where they were spending a holiday in a bungalow near the sea. We botanised to the south, and found a host of interesting plants which seem worthy of arranging in systematic order as follows:—

LIGNOSAE (WOODY DICOTYLEDONS)

- PAPILIONACEAE—*Aspalathus ericifolia* Linn. (No. 526): a shrub with many pale yellow flowers and dense clusters of small linear softly pubescent leaves. *A. laricifolia* Berg. (No. 525a): with similar but closely adpressed-pubescent leaves and very few more conspicuous yellow flowers with a silky standard petal. *A. nervosa* E. Mey. (No. 525): midway between the last two species, with fairly numerous yellow flowers; all these near the sea-coast. *Lotononis tenuifolia* (E. & Z.) Dummer (No. 534): stems prostrate, pilose; leaflets oblanceolate; flowers yellow, few in a cluster to solitary. *Tephrosia capensis* Pers. (No. 522): a slender shrublet-herb with nearly solitary carmine-red flowers; leaflets and pods minutely pubescent, the pods 4·5 cm. long. *Indigofera incana* Thunb. (No. 524): stems prostrate and ascending; leaflets softly pilose with T-shaped hairs, obovate; flowers purplish-red, few in a cluster on a long peduncle.
- THYMELAEACEAE—*Struthiola erecta* Linn. (No. 560): a small tough shrublet, with narrow glabrous leaves and numerous whitish glabrous flowers.
- MALVACEAE—*Malvastrum calycinum* Gray & Harr. (No. 528): shrub 4½ ft.; leaves ovate-pentagonal, thinly and softly pubescent; flowers pinkish-red.
- RUTACEAE—*Agathosma cerefolia* B. & W. (No. 546): a shrub 2–3 ft., with small mauve-white strongly scented flowers in terminal clusters, the pedicels and narrow leaves softly pilose. *A. rugosa* Link (No. 547): a similar shrub, but much less hairy and with broader leaves coarsely gland-dotted.
- ANACARDIACEAE—*Rhus lucida* Linn. (No. 544): a common shrub 4–5 ft. high, with narrowly obovate mucronate leaflets and panicles of very small flowers.
- ASCLEPIADACEAE—*Cynanchum africanum* R. Br. (No. 559): stems twining, softly pubescent; leaves opposite, ovate-elliptic, rather thick; flowers sweet-scented, with a very large corolla-like corona.

HERBACEAE (HERBACEOUS DICOTYLEDONS)

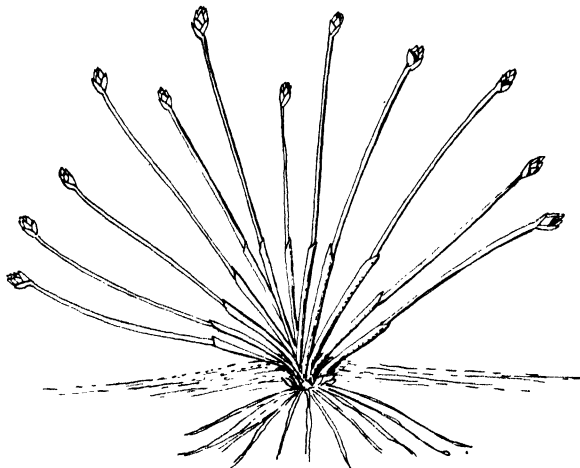
- CARYOPHYLLACEAE—**Silene clandestina** Jacq. (No. 535): a small plant a few inches high, with turbinate crisped-puberulous ribbed calyx and very small petals.
- GENTIANACEAE—**Orphium frutescens** (Linn.) E. Mey. (No. 536): a woody species 1-2 ft., with opposite linear, fleshy, softly puberulous leaves about 3 cm. long, and large showy flowers in the upper axils; anthers large and spirally twisted.
- PRIMULACEAE—**Samolus porosus** Thunb. (No. 537): stems angular; leaves few and linear, acute; flowers racemose, pinkish-white; resembles some CAMPANULACEAE (*Wahlenbergia*) rather than PRIMULACEAE.
- CRASSULACEAE—**Crassula glomerata** Linn. (No. 530): a very tiny species about 1 in. high, growing near the sea cliffs at about 300 ft. altitude; stems flakey-puberulous; leaves lanceolate, fleshy; flowers in dense clusters, very small, green.
- UMBELLIFERAE—**Bupleurum Mundtii** Cham. & Schl. (No. 520): a small shrub, with linear grass-like parallel-nerved leaves and small compound umbels subtended by ovate-lanceolate subfoliaceous bracts.
- COMPOSITAE—**Aster Bergerianus** Harr. (No. 529): very hispid narrowly spatulate leaves, with fairly large heads and bright blue ray-flowers. **Eriocephalus umbellulatus** DC. (No. 541): a shrub 1½-2 ft.; leaves fleshy, turgid, entire or trilobed, shortly silky; umbels few-flowered, white; pappus densely woolly. **Nidorella foetida** DC. (No. 540): spatulate hispidulous leaves, and close corymbs of yellow rayless flower-heads. **Gnaphalium pauciflorum** DC. (No. 531): very dwarf and woolly, with linear leaves, and similar to **Helichrysum capillaceum** Less. (No. 533): also woolly, but leaves obovate-elliptic. **H. maritimum** Less. (Nos. 542 and 545): shrub, 2-3 ft., softly woolly all over; leaves silvery oblong, the lower trinerved from the base, corymbs compact; flowers yellow. **H. revolutum** Less. (No. 533a): woolly undershrub with narrow leaves and shining pale-yellow flower-heads. **H. teretifolium** (Linn.) Less. (No. 548): woody; leaves narrow ericoid, and close clusters of small flower-heads with pink bracts. **Osteospermum monilliferum** Linn. var. **lanosum** DC. (No. 532): a very woolly state of the common species and semi-prostrate near the coast; fruits fleshy and berry-like, a rare feature in COMPOSITAE.
- SCROPHULARIACEAE—**Zaluzianskya dentata** Walp. (No. 538): small pubescent annual with obovate coarsely dentate leaves and clusters of dull-yellow flowers.
- DIPSACACEAE—**Scabiosa africana** Linn. (No. 521): shrubby and softly tomentose all over; leaves lobulate-laciniate, the upper pinnatisect; flowers mauve-blue.
- GERANIACEAE—**Pelargonium betulinum** (Linn.) Ait. (No. 527): a very beautiful species, near the coast; 3 ft. high, softly pilose all over, with orbicular serrate leaves, and few clustered flowers with deep-pink petals, the upper two streaked with carmine.
- LABIATAE—**Stachys aethiopica** Thunb. (No. 561): resembles some European species, with ovate coarsely crenate leaves and verticels of mauve flowers, the lip spotted with carmine.

MONOCOTYLEDONS

- LILIACEAE—**Wurmbea capensis** Thunb. (No. 562): close spikes of white flowers and long strap-shaped leaves; a member of an interesting tribe of LILIACEAE remarkable for the complete absence of bracts.
- CYPERACEAE—**Scirpus venustulus** Boeck. (No. 543): on sand dunes, a good binder; 2-3 in. high; leaves few or reduced; spikelets solitary, dark brown, ovoid, 4-5 mm. long.
- GRAMINEAE—**Eragrostis glabrata** Nees. (No. 539): a dwarf grass occurring on dunes to the south; a good sand-binder, and quite unlike other species of the genus; it closely resembles *Sporobolus virginicus*, also at the Cape, and seems to be a link between the two genera, which are separated by the number of the florets. This species is endemic in the Peninsula.

From Cape Town to beyond Milnerton

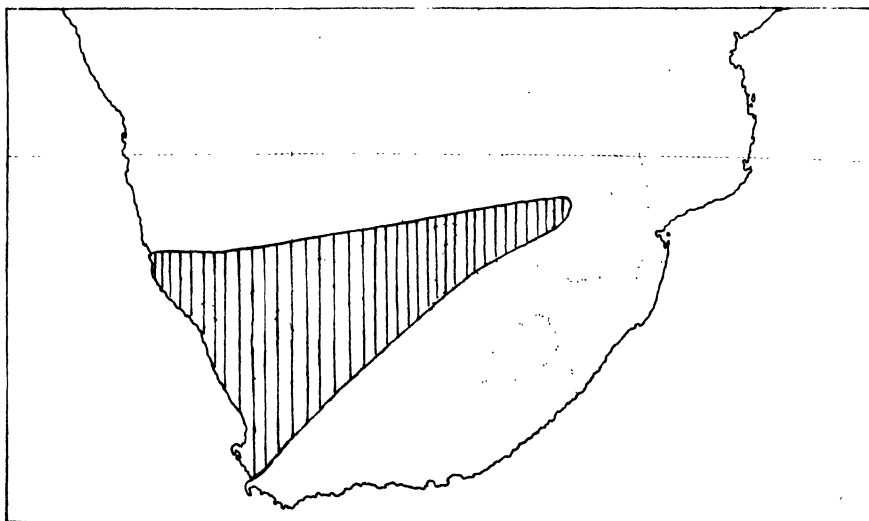
On Friday, 28th September, I took a run in the Citroën to beyond Milnerton,¹ a few miles to the north of Cape Town, and collected some interesting plants.



Scirpus tenuistylus Boeck. (CYPERACEAE), a sand-binder on the Cape Peninsula.

¹ Also collected : No. 549, *Mesembryanthemum criniflorum* L. (FICOIDACEAE); 550, *Dimorphotheca pluvialis* Moench. (COMPOSITAE); 551, *Hermannia scoparia* Harv. (STERCULIACEAE); 552, *Hermannia verticillata* (Linn.) K. Schum.; 553, *Aizoon paniculatum* Linn. (FICOIDACEAE); 554 (see next page); 555, *Cyphia Cardamines* Willd. (CAMPANULACEAE); 556, *Bulbinella triquetra* Kunth (LILIACEAE).

On the Cape Flats towards Cape Town I gathered the common *Leucadendron adscendens* R. Br. (PROTEACEAE) (No. 557), and *L. venosum* R. B. (No. 558).



Approximate range of the genus *Grielum* (ROSACEAE) (see p. 112).

Here were fine examples of a striking plant which at first sight seemed to belong to GERANIACEAE, but which proved to be *Grietum tenuifolium* Linn. (No. 554), a member of the ROSACEAE. This species ranges from about here as far north as Saldanha Bay, and the genus northwards to Namaqualand, extending eastwards to the Transvaal. Probably all the species are perennial, with tuberous rootstock, but seedlings may flower the first year, and then it is very interesting to find that they resemble *Neurada* (also ROSACEAE) and *Gorteria* (COMPOSITAE) in retaining around the primary root the persistent calyx, like a collar, which no doubt helps to anchor the plantlet in the sand. The "anchor" is formed by the nerves of the calyx, from which the thinner tissue has withered away. This is particularly noticeable in *G. obtusifolium* E. Mey. (*G. Marlothii* Engl.). *G. tenuifolium* was found prostrate in sandy flats among grasses about 100 yds. from Table Bay, the flowers being bright yellow and very showy. They dry a vivid green.

Visit to Ceres

On Sunday, morning 30th September, I accompanied Mr. Pillans by train to Ceres, where he was to judge at the flower-show on the following day. In the afternoon we botanised in a gorge near Ceres, which is approached via the water-works of the town, and we found quite a host of interesting plants, and even some new species. But perhaps our No. 577 proved to be the most intriguing of all, a prostrate subshrub growing in sandy soil. Our specimen was in bud, the flowers being small and difficult to dissect, especially the ovary, about the size of a pin's head. For some time I was puzzled even as to the family, the growth, quite like a small *Lycopodium*, the short branchlets being closely beset with small triangular sharp-pointed leaves with thickened margins, and a subsessile cluster of pale greenish-white flowers subtended by bracts, almost after the manner of some THYMELAEACEAE. The puzzle, however, proved to be *Psammotropha quadrangularis* (Linn. f.) Fenzl., belonging to the MOLLUGINACEAE.

The species appears to adopt two forms: one, which is probably the typical one collected by Thunberg in the Verkeede Valley on 11th December, 1774, with narrow subulate-lanceolate very sharply pointed leaves loosely arranged, and with a pedunculate inflorescence; the other, as collected by us, with shorter triangular leaves and a subsessile inflorescence. But a specimen collected by Drège near Ezelsfontein has the leaves of the one and the inflorescence of the other, so there seems nothing of any taxonomic value between them.

Bolus also collected our form near Ceres, possibly at the same spot, in January 1888, and again in October 1889. I include a transcription of the younger Linnaeus' text to give an idea of the type of botanical description which was considered sufficient towards the close of the eighteenth century. Linnaeus' original description reads as follows:—

"Pharnaceum subfruticosum, foliis linearibus quadrifariam imbricatis.

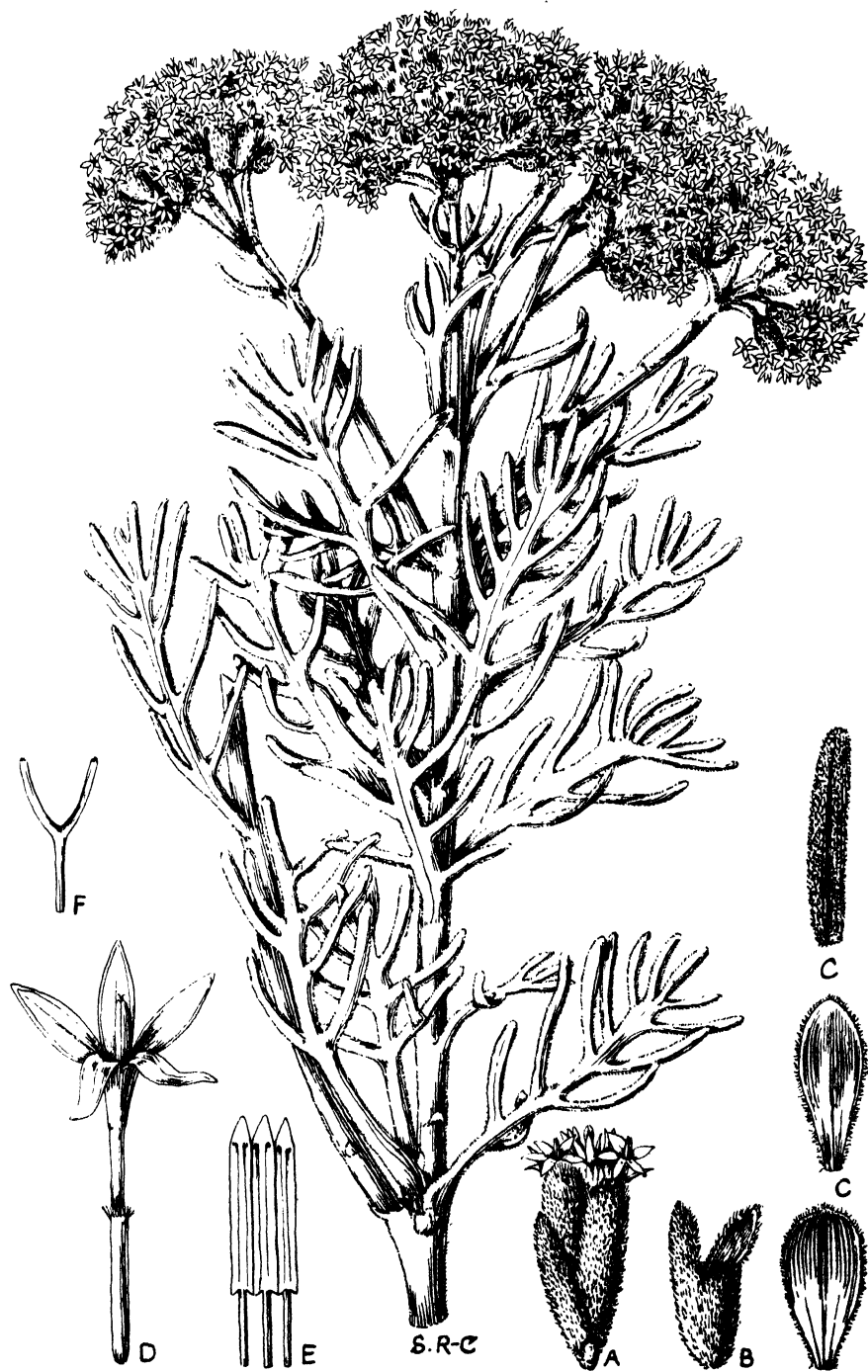
Habitat ad Cap. bonae spei. h.

Caules subfruticosi, Ericae facie.

Folia acerosa, subulata, minuta, quadrifariam imbricata, laevia.

Paniculae terminales, conglomeratae, parvae.

Flores albi, extus virides."



Athanasia speciosa Hutch. (COMPOSITAE), a new species from near Ceres.

A, flower-head; B, part of involucre; C, bracts; D, flower; E, stamens; F, style arms.

I was fortunate to find in this interesting gorge an entirely new and very striking species of *Athanasia* ¹ (No. 574). It was growing at the foot of the cliffs in a small patch, like Tansy (*Tanacetum*) grows in Britain, and is a shrub 2-3 ft. high, with snow-white beautifully tomentose leaves and with close corymbs of rich creamy-yellow flowers. It is not often that a "herbarium botanist" has the pleasure of discovering such a beautiful new plant, and I was thrilled at the time with the sight of it, though I was then unaware of its being new to science.

Another rare plant in this same gorge and only described a few years ago was *Metalasia Barnardii* L. Bolus (No. 618), a striking species with beautiful very close corymbs of bright-pink flower-heads. It was first collected by Dr. Barnard, of the Cape Town Museum, on Sneeuwkop, Wellington, at 5000 ft.

Another plant which has proved to be a rarity was No. 576,² which I took to be a *Senecio*, but which proves to be *Cineraria tomentosa*. As I had drawn up a latin description, it seems worth publication. Plants of this species were found in a small association, and even in the field the species was one which struck me as being very distinct.

And to complete our list of novelties, our No. 613 proved to be undescribed. This is a new species of *Struthiola*,³ which I have pleasure in naming after my companion on this trip, Mr. N. S. Pillans.

Two other species collected in this locality proved to be interesting. These were *Indigofera dillwynioides* Benth. (No. 588) and *I. filicaulis* Eckl. & Zeyh. (No. 591), and not only did they grow next to each other in the gorge, but they also stand next to each other in the classification in the *Flora Capensis*. The former species has ascending stiff branches

¹ ***Athanasia speciosa* Hutch. sp. nov.** ubique molliter albo-tomentosa valde distincta.

Frutex 0.75-1 m. altus, ubique molliter albo-tomentosus. Folia pinnati-partita, circiter 5 cm. longa et lata, segmentis linearibus apice cartilagineo-apiculatis. Capitula cremeo-flava, dense corymbosa, 3-4-flora. Involucri bractee paucae, 7-8 mm. longae, dense tomentosae. Achaenia glabra, setulis brevissimis coronata.

South Africa: Waterkloof Gorge, west of Ceres, 30th September, 1928, *Hutchinson* 574 (type in Kew Herbarium).

² ***Cineraria tomentosa* Less.**, descr. ampl. ubique albo-lanata, foliis supra demum glabris spatulato-oblanceolatis acute denticulatis, pedunculis elongatis distincta.

Suffrutex circiter 3 m. altus, ubique albo-lanatus; caulis basin versus radicibus gracilibus emittens. Folia spatulato-oblanceolata, ad basin leviter auriculatam sensim angustata, 4-8 cm. longa, 1.5-2.5 cm. lata, supra demum glabrescentia, margine acute denticulata. Capitula racemoso-paniculata, pauca, pedunculis elongatis gracilibus. Involucrum campanulatum, basi lanatum; bractee lineares, 6 mm. longae, glabrae, carinatae. Flores radii flavi. Achaenia molliter pubescentia.

South Africa: Waterkloof Gorge west of Ceres, in caves and in shade of rocks, rare, 30th September, 1928, *Hutchinson* 576.

³ ***Struthiola Pillansii* Hutch. sp. nov.** foliis ciliatis calycis tubo fere glabro, petalis 8 basi longe pilosis distincta.

Frutex, ramis erectis virgatis glabris. Folia opposita, suberecta, carinato-acicularia, subacuta, 8 mm. longa, marginibus incurvis pilis rigidis ascendentibus ciliata. Flores axillares, solitarii, sessiles. Calycis tubus gracilis, 1.7 cm. longus, parce adpresse pubescens, apicem versus leviter et breviter ampliat; lobi patuli, lineari-lanceolati, 4-5 mm. longi, delicate nervosi, apice pilis brevibus instructi. Petala 8, parva, basi pilis longissimis instructa. Stamina 4, inclusa; antherae 1.5 mm. longae, obtuse apiculatae. Ovarium glabrum.

South Africa: Waterkloof Gorge, west of Ceres, 30th September, 1928, *Hutchinson* 613 (type in Kew Herbarium).



Metalasia Barnardii L. Bolus (COMPOSITAE), with beautiful bright pink flower-heads; from near Ceres.

A, several flower-heads; B, one involucre; C, involucral bracts; D, bunch of flowers and various parts; E, style-arms.



Cineraria tomentosa Less. (COMPOSITAE), a rare species from near Ceres.

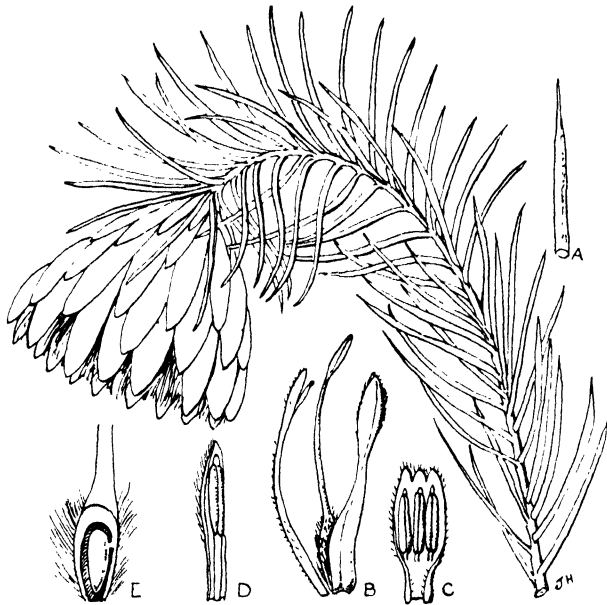
and fairly stout peduncles, and the latter semi-prostrate branches and filiform peduncles; both have crimson flowers and are pretty little plants.

This "Waterkloof" Gorge at Ceres provided so many remarkable species, as stated above, that it seems worth while to arrange them in systematic order :—

LIGNOSAE (WOODY DICOTYLEDONS)

ROSACEAE—**Cliffortia tuberculata** (Harv.) H. Weim. (Nos. 567 and 606): shrub up to 4½ ft., with clustered finely acicular leaves about 6 mm. long and small sessile flowers.

PAPILIONACEAE—**Indigofera dillwynioides** Benth. (No. 588) (see p. 114).
I. filcaulis Eck. & Zeyh. (No. 591) (see p. 114).



Protea rosacea Linn. (PROTEACEAE), with bright red bracts; in Waterkloof Gorge, Ceres.

A, upper part of leaf; B, flower; C, stamens and part of perianth; D, odd stamen; E, vertical section of ovary.

BRUNIACEAE—**Berzella squarrosa** Sond. (No. 602): shrub 3 ft.; leaves acicular, crowded, glabrous; heads shortly racemose, globose, 7–8 mm. diameter, pale yellow.

THYMELAEACEAE—**Gnidia oppositifolia** Linn. (No. 563): a slender shrub 3–4 ft. high, with opposite ovate-lanceolate leaves; flowers few at the ends of the shoots, creamy-yellow; perianth silky. **Lachnaea filamentosa** (Linn. f.) Gilg (No. 599): shrub with obovate alternate leaves about 2 cm. long, and dense balls of densely silky white flowers with slender long exserted stamens. **Struthiola Pillansii** Hutch., new sp. (No. 613) (see p. 114).

PROTEACEAE—**Serruria longipes** Phillips & Hutch. (No. 565): shrub 2–3 ft., with subsessile finely divided leaves and terminal balls of milky-white softly villous flowers surrounded by ovate-acuminate bracts. **Leucadendron concinnum** R. Br. (No. 616): shrub; leaves oblanceolate, 4–5 cm. long; male flower-heads globose, sessile, 2.5 cm. diam., creamy-white. **Protea rosacea**

Linn. (No. 600); a low shrub with numerous acicular very sharply pointed leaves about 2 cm. long; flower-heads nodding, 4-5 cm. diam., with bright red spatulate inner bracts.

POLYGALACEAE—**Muraltia Heisteria** DC. (No. 590): a small shrub with long whip-like branches and beautiful magenta flowers resembling PAPILIONACEAE.

ERICACEAE—**Erica Plukenetii** Linn. (No. 582): shrublet 2-3 ft.; leaves glabrous; corolla scarlet, nodding, the long anthers partly exserted. **E. curviflora** Linn. (No. 601): shrub 4 ft.; branchlets softly pubescent; leaves glabrous; corolla brick-red, curved, 2.5 cm. long, shortly pubescent; anthers short, exserted. **E. caffra** Linn. (No. 603): shrub 3 ft.; leaves glabrous; corolla grey, short, hoary-villous. **E. tenuis** Salisb. (No. 604): very floriferous; flowers small, white; anthers included in the corolla-tube. **E. tenuifolia** Linn. (No. 596): also very floriferous; calyx and corolla mauve-pink.



Dodonaea Thunbergiana Eckl. & Zeyh. (SAPINDACEAE); from Ceres.

A, lower surface of leaf; B, portion of same, enlarged; C, flower; D, anther; E, pistil; F, fruit.

E. cristaeiflora Salisb. (No. 594): similar to the last, but flowers crimson.

E. imbricata Linn. (No. 609): calyx white; corolla very small; anthers brown, exserted. **Grisebachia eremioides** MacOwan (No. 615): flowers very small and numerous, white, forming little "spikes".

Eremia totta Don (No. 614): shrub intricately branched; leaves setose; calyx and corolla white, the former ciliate. **Scyphogyne inconspicua** Brogn. var. **vestita** N.E. Br. (Nos. 607, 610): shrub 3 ft., very sticky, branchlets very short and crowded; flowers very small, greenish-white.

CELASTRACEAE—**Gymnosporia laurina** Thunb. (No. 571): shrub up to 8 ft., with grey-green narrowly obovate emarginate nerveless leaves. **G. lucida** (L.) Loesn. (No. 611): like the last, but with distinct lateral nerves.

RHAMNACEAE—**Phyllica excelsa** Wendl., var. **papillosa** Sond. (No. 608): a shrub with virgate branches, with narrow recurved leaves, and sessile flowers with inferior ovary in the upper leaf-axils.

RUTACEAE—**Agathosma commutata** Sond. (No. 605): a virgate shrub, with acicular acute leaves, and red pedicels to the small white flowers arranged

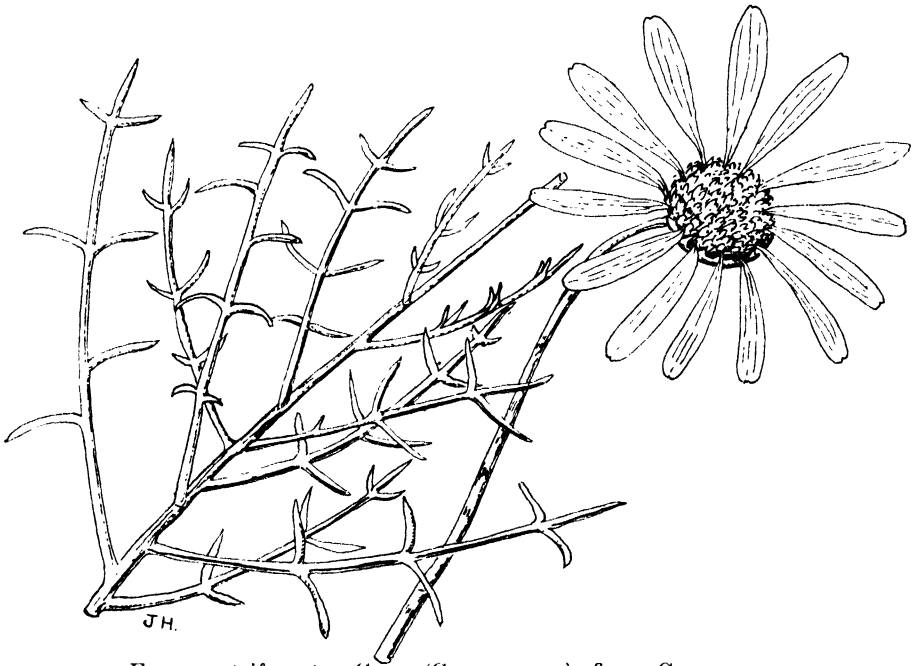
in terminal clusters. **Barosma crenulata** Hook. (No. 572): a shrub 4-5 ft. with a strong scent; leaves oblanceolate, obtuse, about 3 cm. long, closely serrulate, markedly punctate; flowers pinkish-white, axillary on lateral branchlets; fruits with hairy-tipped horns.

SAPINDACEAE—**Dodonaea Thunbergiana** Eckl. & Zeyh. (No. 593): representative of a tropical genus with very narrowly linear leaves and winged fruits.

RUBIACEAE—**Anthospermum aethiopicum** Linn. (No. 612): a shrub with stiff straight branches, the branchlets densely covered with strongly recurved linear leaves with cartilaginous tips; flowers sessile, with long hairy styles.

HERBACEAE (HERBACEOUS DICOTYLEDONS)

MOLLUGINACEAE—**Psammotropha quadrangularis** (Linn. f.) Fenzl. (No. 577): see p. 112.



Euryops trifurcatus Cass. (COMPOSITAE), from Ceres; ray-flowers yellow.

CAMPANULACEAE—**Cyphia** sp. (No. 579): twiner with small hastately tripartite leaves and axillary creamy-yellow flowers. **C. volubilis** Willd. (No. 580), similar to the last, but with mauve flowers.

COMPOSITAE—**Malrea microcephala** DC. (No. 564): shrublet with acicular fine-pointed leaves and solitary pedunculate small heads of white flowers; pappus plumose. **Helichrysum maritimum** Less. (No. 598): shrublet with canous branches and leaves and small clusters of yellow flower-heads. **Metalasia Barnardii** L. Bolus (No. 618) (see p. 115). **M. intermedia** DC. (No. 581): slender virgate branches with clusters of minute leaves and small dense clusters of deep-pink flower-heads surrounded by a very woolly involucre. **Athanasia speciosa** Hutch., new sp. (No. 574) (see p. 114). **Cineraria tomentosa** Less. (No. 576) (see p. 114). **Senecio sophioides** DC. (No. 570): herb like common groundsel, with small yellow rays. **Euryops trifurcatus** Cass. (No. 597): shrub 3 ft.; leaves cut into fine acicular acute segments; heads on slender peduncles and subcorymbose; rays yellow. **Dimorphotheca Tragus** DC. (No. 578): shrubby, the branches clothed with old withered leaves; leaves linear, toothed, glandular; rays

pale cream, darker below; a beautiful species. **Othonna amplexicaulis** Thunb. (No. 566): locally common; 3-4 ft.; leaves broadly spatulate-obovate, glabrous, auricled at the base; flower-heads numerous in fairly large corymbs like Ragwort, rays yellow.

SCROPHULARIACEAE—**Nemesia diffusa** Benth. (No. 587): in shade of rocks; herb 15-18 in. high, with ovate sharply serrate leaves and mauve flowers.

GERANIACEAE—**Pelargonium capillare** (Car.) Willd. (No. 569): in sand; leaves numerous and crowded on short stems, pinnatipartite; flowers just overtopping the leaves, 2-3 in an umbel, the petals carmine-red and a deeper red below. **P. tabulare** L'Herit. (No. 589): slender stems and weakly pilose; leaves palmately lobed with a broad crimson streak about the middle, and few creamy-white flowers.

MONOCOTYLEDONS

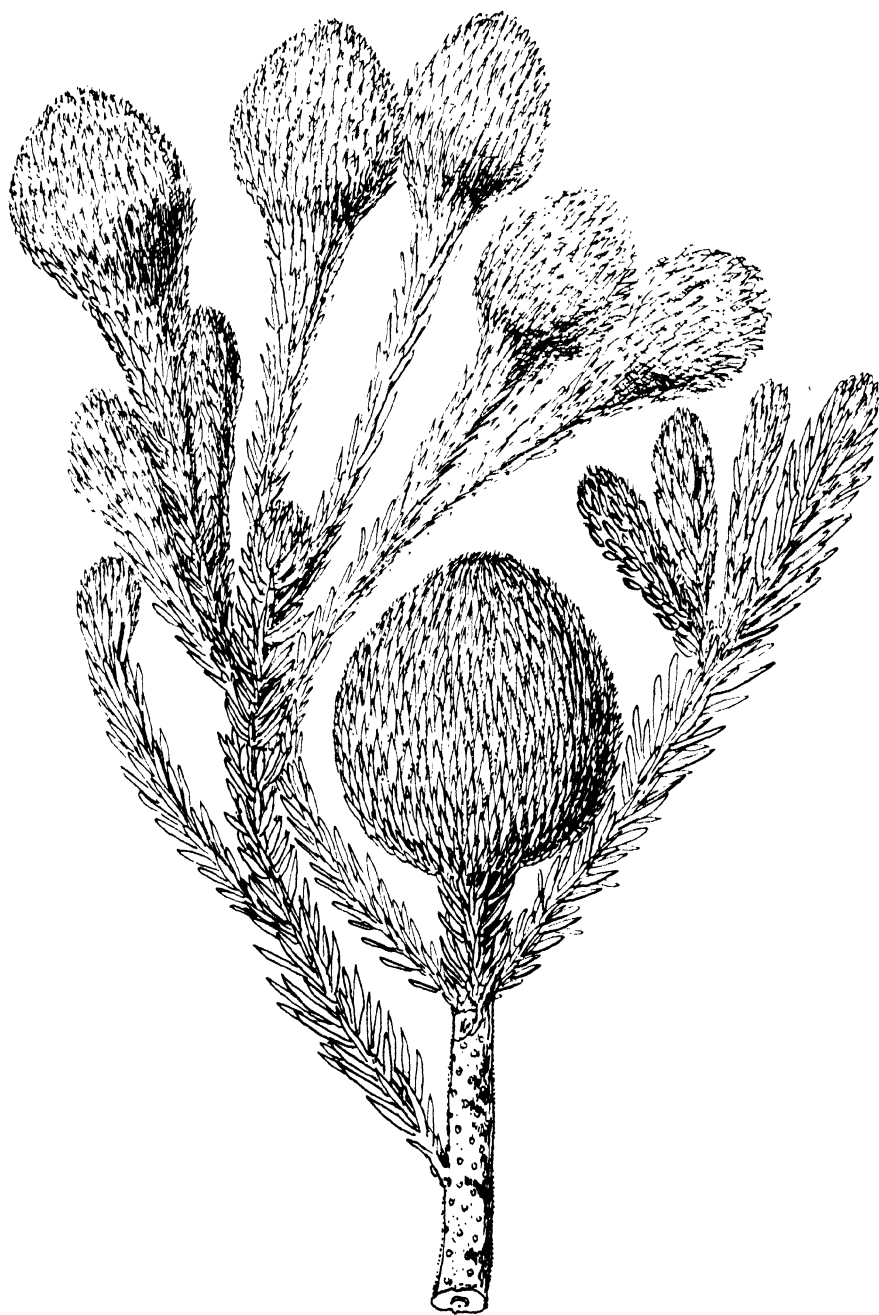
IRIDACEAE—**Watsonia Meriana** Ker. (No. 573): among rocks at side of steep cliff; 3 ft. high and very handsome; longish spikes of scarlet flowers with black anthers; perianth-lobes rounded at the apex. **W. sp.** (No. 585): similar but 2½ ft. high, with fewer flowers and sharp-pointed perianth lobes. **Gladiolus inflatus** Thunb. (No. 568): stems very slender; leaves elongate and slender; flowers paired, nodding, crimson, speckled with carmine.

ORCHIDACEAE—**Holothrix villosa** Lindl. (No. 595): 6 in. or so high, with one ovate-cordate leaf at the base of the retrorsely pilose stem; bracts and ovary villous. **Satyrion cucullatum** Thunb. (No. 583): 9 in. high, with two fully developed stem leaves broadly ovate and looped-nerved, and reduced tube-like stem-leaves; flowers long-spurred, greenish-yellow. **Schizodium obtusatum** Lindl. (No. 584): stem wiry, with a wiry "kink" near the base; leaves basal, spatulate-obovate; flowers mauve, speckled outside, distinctly stalked. **Disa comosa** (Rchb.) Schlechter (No. 575): leaves ovate-lanceolate; flowers greenish-yellow with large membranous bracts.

RESTIONACEAE—**Elegia juncea** Linn. (No. 617): leaf sheaths 2.5-3 cm. long, the upper ones cuspidate; male flowers brown. **Restio strobilifer** Kunth (No. 592a): leaves amplexicaul, 1 cm. long; male "cones" hard, narrowly obovoid, blunter than the little longer females. **Chondropetalum paniculatum** (Mast.) Pillans (No. 592): leaves reduced to a very short tube; floral bracts glume-like, narrow and pointed, membranous.

CYPERACEAE—**Ficinia radiata** Kunth (No. 586): damp places in the gorge; dwarf; leaves recurved; bright-yellow involucre.

It has sometimes happened in South Africa that at flower-shows rare and even undescribed species have been shown on the stands. Ceres was no exception, and the following were procured for the Kew Herbarium, most of them rare species: *Euryops Serra* DC. (COMPOSITAE) (No. 619); *Athanasia incisa* (DC.) Harv. (COMPOSITAE) (No. 620); *Protea glabra* Thunb. (PROTEACEAE) (No. 622); *Gladiolus Lousiae* (IRIDACEAE) (No. 623); *Protea pityphylla* Phillips (PROTEACEAE) (No. 624); *Leucadendron Schinzianum* Schltr. (PROTEACEAE) (No. 625); *Senecio cakilefolius* DC. (COMPOSITAE) (No. 626); *Phylica insignis* Pillans (RHAMNACEAE) (No. 627); *Lasiospermum erectum* (Poir.) Druce (COMPOSITAE) (No. 628); *Aster scabridus* E. Mey. (COMPOSITAE) (No. 629); *Brunia Marlothii* Schltr. (BRUNIACEAE) (No. 631) (see figure, p. 121); *Nebelia globosa* Dummer (BRUNIACEAE) (No. 630); *Protea Marlothii* Phillips (PROTEACEAE) (No. 632); *Willdenovia humilis* Mast. (RESTIONACEAE) (No. 633); *Raphnia spicata* Thunb. (PAPILIONACEAE) (No. 634); and *Restio curviramis* Kunth (RESTIONACEAE) (No. 635).

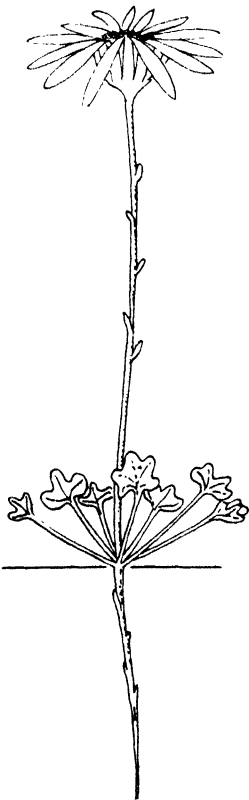


Brunia Marlothii Schltr. (BRUNIACEAE), a rare species procured at the Ceres Flower Show.

Chapter VIII

BOTANISING ON THE CAPE PENINSULA

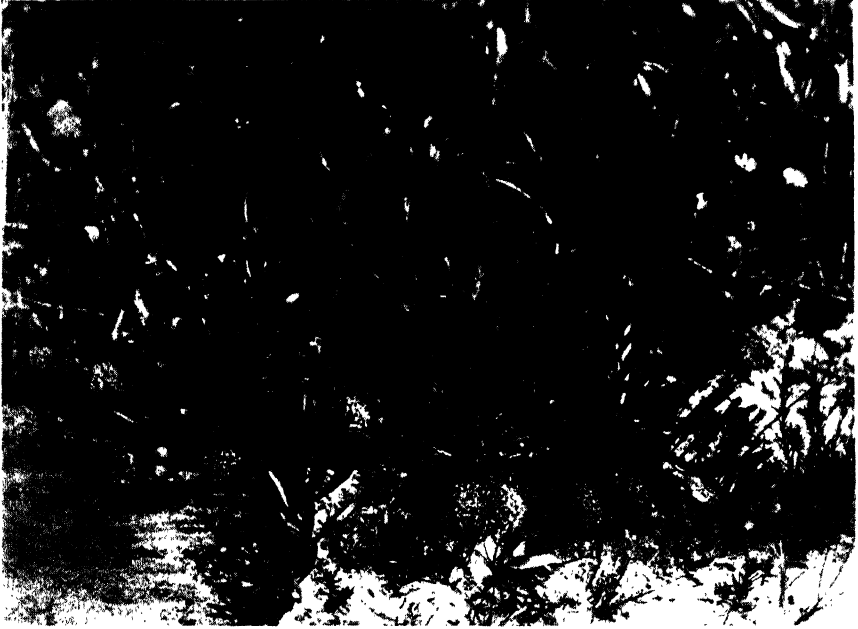
AN interval now occurred for me to do some botanising entirely by myself, so I started for a tour of the Cape Peninsula in the little Citroën on Thursday, 4th October. I took the road through Rondebosch and Muizenberg, and near Glencairn collected the following plants: *Pharnaceum cordifolium* L. (*P. obovatum* Bolus) (MOLLUGINACEAE) (No. 637); an interesting species found only on the Peninsula, with clustered spatulate leaves on slender stems prostrate in sand, sepals pinkish-white outside. *Sutera lychnidea* (L.) Hiern (SCROPHULARIACEAE) (No. 638): a herb up to 2½ ft., with short leafy branchlets in the axils of linear subentire leaves and dirty-yellow flowers; this extends along the sand-dunes from the Peninsula north to Saldanha Bay; in the herbarium especially there is great superficial resemblance between this species and *Zaluzianskya maritima* Walp, which has no leafy axillary branches. *Gymnodiscus capillaris* Less. (COMPOSITAE)



Senecio hastifolius
(Linn. f.) Less. COM-
POSITAE; from the
Cape Peninsula.

(No. 639): a very variable prostrate plant with lyrate leaves and small corymbs of yellow flower-heads with few involucre bracts in one row. *Capnophyllum africanum* Koch (UMBELLIFERAE) (No. 640): branches prostrate in sandy dunes; inflorescences sessile. *Helichrysum crassifolium* Less. (COMPOSITAE) (No. 641): branches and spatulate leaves woolly; heads white, densely clustered. *Pelargonium capitatum* Ait. (GERANIACEAE) (No. 642): softly pilose all over, with partite rounded crenulate leaves and capitate mauve-pink flowers, the upper part of the petals streaked with carmine; fruits softly pilose, beak-like.

South of Simonstown I met with some typical Cape plants: *Zaluzianskya villosa* F. W. Schmidt (SCROPHULARIACEAE) (No. 643): an annual in sandy soil, dwarf, flowers a beautiful mauve with orange "eye". *Arctotis aspera* Linn. (COMPOSITAE) (No. 644): a species with deeply partite narrow leaves and white rays, reddish-purple below. *Dolichos gibbosus* Thunb. (PAPILIONACEAE) (No. 645): a climber up to 12 ft. over bushes, with ovate-rhomboid leaflets and short dense racemes of carmine-purple flowers, the brush of hairs on one side of the style, as in all good species of *Dolichos*; from the Peninsula this pleasing species extends north-east as far as the National Park, Natal. *Silene undulata* Ait. (CARYOPHYLLACEAE) (No. 646): on cliffs, with lanceolate ciliolate leaves and subsolitary mauve-white flowers. Two *Lobelias*



Leucospermum hypophyllum R. Br. (PROTEACEAE), near Smith's Farm, Cape Peninsula, with flower-clusters on the ground.

growing together, *L. Erinus* Linn. (LOBELIACEAE) (No. 647): stems prostrate; leaves oblanceolate; flowers blue; and *L. triquetra* Linn. (No. 647a): stems ascending; leaves linear, coarsely toothed; flower blue. *Senecio hastifolius* (Linn. f.) Less. (COMPOSITAE) (No. 649): a little plant with tiny spade-like leaves and quite a handsome solitary head of white ray-flowers tinged with purple below; certainly a charming little plant to grow in a pan in a cool greenhouse. *Ursinia crithmoides* Poir. (COMPOSITAE) (No. 650): a beautiful little annual with orange-yellow rays, coppery below.

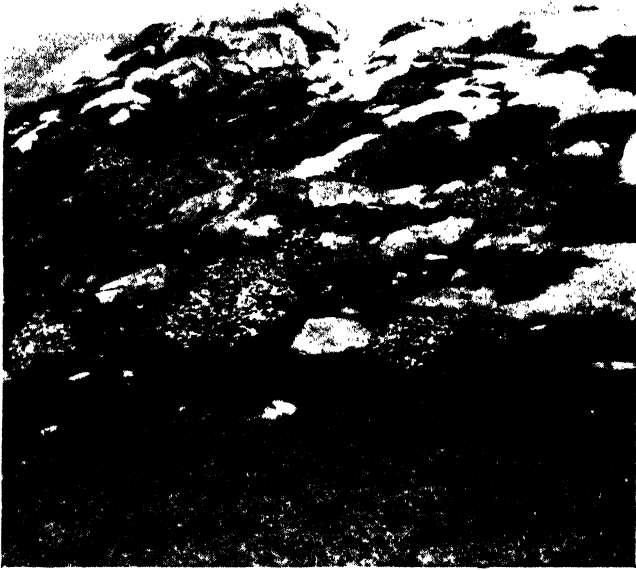
Having, I hope, stimulated some readers to follow in my footsteps, I shall describe only the more striking of the plants I collected on this delectable Cape Peninsula, with Simons Bay shimmering alongside, the silvery peaks of Hottentots Holland Mountains glistening in the far distance, the little Citroën humming along contentedly, reluctant to stop even to botanise, and the motoring half of me tending to get the upper hand now and again.

At Smitwinkel Bay I paused to gather *Gladiolus ornatus* Klatt (IRIDACEAE) (No. 651): with only one very narrow leaf and two or three mauve nodding flowers, whilst near Vasco da Gama I was halted by striking plants of *Pelargonium cucullatum* Ait. (GERANIACEAE) (No. 652): 3–5 ft. high, among rocks; flowers a brilliant crimson with darker streaks, and *Grammanthes centauroides* (Linn.) Druce¹ (CRASSULACEAE), a dwarf yellow annual much resembling some GENTIANACEAE, and, indeed, showing the close relationship of these two

¹ Synonyms *Crassula centauroides* Linn. and *C. dichotoma* Linn., *Grammanthes gentianoides* DC. and of the *Flora Capensis*.

families and with CARYOPHYLLACEAE.¹ This species extends northwards as far as the Vanrhyns Pass, Calvinia.

I put up at Smith's Farm, a quaint old place, but very comfortable. As soon as I was settled I botanised towards the bay, and collected the following : *Osteospermum polygaloides* Linn. (COMPOSITAE) (No. 654); *Diastella serpyllifolia* Knight (PROTEACEAE) (No. 655); *Metalsia fasciculata* Don. (COMPOSITAE) (No. 656); *Ifloga reflexa* (Linn.) Schltr. (COMPOSITAE) (No. 657); and *Leucospermum hypophyllum* R.Br.



"*Mesembryanthemum* " (FICOIDACEAE), on the Cape Peninsula.

(PROTEACEAE) (No. 658); with prostrate branches, narrowly oblanceolate-linear leaves trifid at the apex and heads of cream-yellow flowers. In the evening I took a run as far as the old lighthouse near Cape Point.

On 5th October I made a further excursion from Smith's Farm towards Cape Point. Between the farm and Vasco da Gama I gathered some interesting species : *Romulea triflora* (Burm.) N.E. Br. (IRIDACEAE) (No. 659) : flowers rich yellow. *Geissorhiza secunda* Ker (IRIDACEAE)

¹ See Hutchinson, *Families of Flowering Plants*.



Ferraria undulata Linn. (IRIDACEAE), from the Cape Peninsula (after Drapiez).



Pelargonium cucullatum Ait. (GERANIACEAE), among rocks at Smitwinkel Bay, Cape Peninsula.



The new lighthouse at Cape Point.



[Photogrs. by the Author.]

The old lighthouse at Cape Point.



The Cape of Good Hope.

[Photogr. by the Author.]

(No. 660), with blue flowers. *Petalacte coronata* Don (COMPOSITAE) (No. 661): a hoary species with white involueral bracts. *Aspalathus carnosa* Berg. (PAPILIONACEAE) (No. 662). *Passerina ericoides* Linn. (THYMELAEACEAE) (No. 663): a species endemic in the Peninsula. *Senecio arniciflorus* DC. (COMPOSITAE) (No. 663a): leaves thick, woolly below; rays yellow. *Ferraria undulata* Linn. (IRIDACEAE) (No. 664): a striking plant introduced into Europe about 1640, with distichous leaves and greenish-white flowers mottled with chocolate-brown; I collected a few corms.

At Vasco da Gama was a familiar genus of the PROTEACEAE, *Serruria hirsuta* R.Br. (No. 665), with the softly villous flower-heads hidden among the deeply cut filiform leaf-segments. *Podalyria sericea* R.Br. (PAPILIONACEAE) (No. 666): leaves and fruits silky. *Senecio maritimus* Linn. (COMPOSITAE) (No. 667): stems spreading; leaves spathulate-oblongate, dentate; flower-heads yellow; outer bracts with black tips, ciliate. *Agathelpis dubia* (Linn.) Hutch. (SCROPHULARIACEAE) (No. 668): a species requiring a new name combination.

Near the lighthouse at Cape Point was *Gnidia squarrosa* (Linn.) Druce (*G. polystachya* Berg.) (THYMELAEACEAE) (No. 669). *Geissorhiza humilis* Ker (IRIDACEAE) (No. 670); with yellow flowers.

At Smith's Farm I collected two other interesting monocotyledons: *Wachendorfia paniculata* Linn. (HAEMODORACEAE) (No. 671), with bright red corms; this genus is endemic in South Africa; *Disa cylindrica* Thunb. (No. 672), a species much resembling a *Habenaria*.

Notes on the Flora of the Cape Peninsula

For the general reader with little or no knowledge of the flora of the Cape Peninsula I may now give a short sketch of the area which, for its size, is one of the richest floral regions in the world. As defined by Bolus it embraces nearly 200 square miles, and the British reader may gain some idea of its size on comparing it with the Isle of Wight, which contains 155 square miles. On the Cape Peninsula there are well over 2000 species of flowering plants.

The land surface consists of a narrow mountainous tract running nearly due north and south, ending at the south in a narrow, precipitous point. In length it is about 40 miles, with a greatest width of 9 miles. The mountain range, which forms the backbone of the Peninsula, culminates in its highest point, at the northern end, in Table Mountain (3582 ft.), the general altitude of the range gradually decreasing southwards.

The annual mean temperature ¹ just above sea level for the six summer months is 68° F., and for the six winter months 54·5° F., the minimum for one year (for example, in 1898) being 30·1° F. (in June), and the maximum 95·7° (in February). Frosts are practically unknown. Rain is most frequent in the five months during winter from May to September, and is least in summer from January to April, when the surface soil often becomes very dry. Snow or sleet is very rare, and then only on Table Mountain.

The appearance of the vegetation has been well described by Bolus and Wolley-Dod,² the prevailing aspect being that of a number of low-growing shrubs of a dark or bluish-green hue.

The mountain-sides on the west and north appear to be very barren, because of the absence of grasses; but on the eastern sides there is a more luxurious vegetation, especially in the dark, deep ravines, which are full of trees and shrubs. The genera to which these belong are mainly tropical in their general distribution. They are found farther east in the Knysna and Zitzikamma forests, and they occur right along the forests of the Drakensberg escarpment into Tropical Africa, whence they have probably migrated. Widely spread in the tropics, and represented in these habitats, are *Grewia*, *Gymnosporia*, *Olinia*, *Canthium*, *Sideroxylon*, *Royena* and *Podocarpus*, the last mentioned, however, mostly occurring at somewhat high altitudes in the tropics.

Open mountain-sides are clothed with PROTEACEAE, the most striking being the silver tree, *Leucadendron argenteum* Linn., a subsocial species which occurs up to 1000 ft. altitude. On the lower foothills, and on the nearby Cape Flats, the vegetation consists of small shrubs, particularly of RUTACEAE, POLYGALACEAE, PAPILIONACEAE, BRUNIACEAE, COMPOSITAE, LOBELIACEAE, ERICACEAE and THYMELAEACEAE. Very striking species are *Podalyria calyptрата* (PAPILIONACEAE), another subsocial species, and numerous species of *Erica*, of which there are about one hundred different kinds on the Peninsula. *Erica hirtiflora* grows in some quantity, and oftentimes gives colour to the landscape. The genus *Leucadendron* causes some bright colours in the vegetation at certain seasons.

¹ See Bolus and Wolley-Dod, *Trans. S. Afr. Phil. Soc.*, 14 : 212 (1903).

² Bolus and Wolley-Dod, *l.c.* 213.

On the sandy soil of the flats the family RESTIONACEAE is often dominant, and occupies a rôle usually held elsewhere by the GRAMINEAE, which are poorly represented on the Peninsula.

In the Cape Region is another endemic family, GRUBBIACEAE, composed of one genus *Grubbia*, with four species. In an early volume of the *Flora Capensis* (vol. 2 : 325) the genus was included in the family



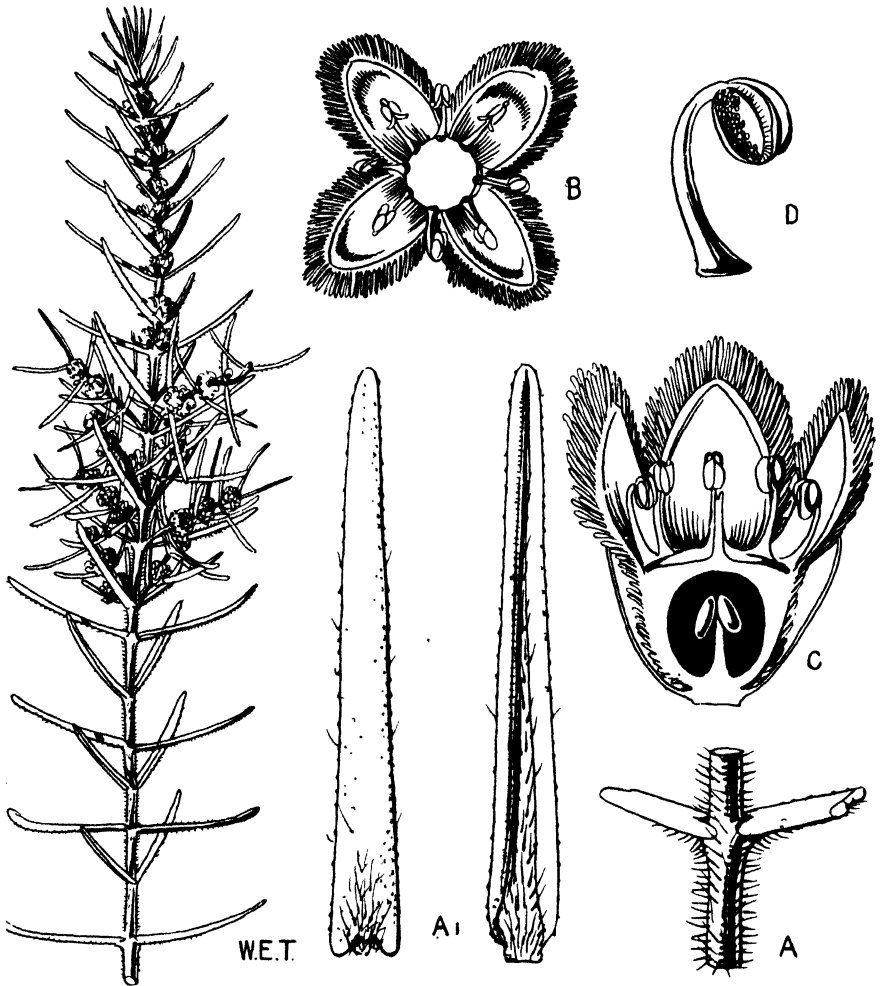
Anemone capensis Linn. (RANUNCULACEAE), an isolated species on the Cape Peninsula.

A, stamen ; B, carpel.

HAMAMELIDACEAE, but Bentham and Hooker removed it to SANTALACEAE, wherein it was again described in the *Flora* (vol. 5, 2 : 209). It differs from SANTALACEAE mainly in having twice as many stamens as calyx-lobes and the anthers inflexed in bud. Two species occur on Table Mountain, *G. rosmarinifolia* Berg. (see figure, p. 130) and *G. pinifolia* Sond.

Another interesting fresh-water aquatic family well represented

in South Africa is APONOGETONACEAE, comprising the single genus *Aponogeton*, which is confined to the warmer parts of the Old World. *Aponogeton distachyon* Linn. f., the "Waterblom" or "Wateruintje", is common in ponds on the Cape Flats and elsewhere. The genus occurs in Tropical Africa, India and Indo-China, and in New Guinea and Eastern Australia (see map, p. 132).

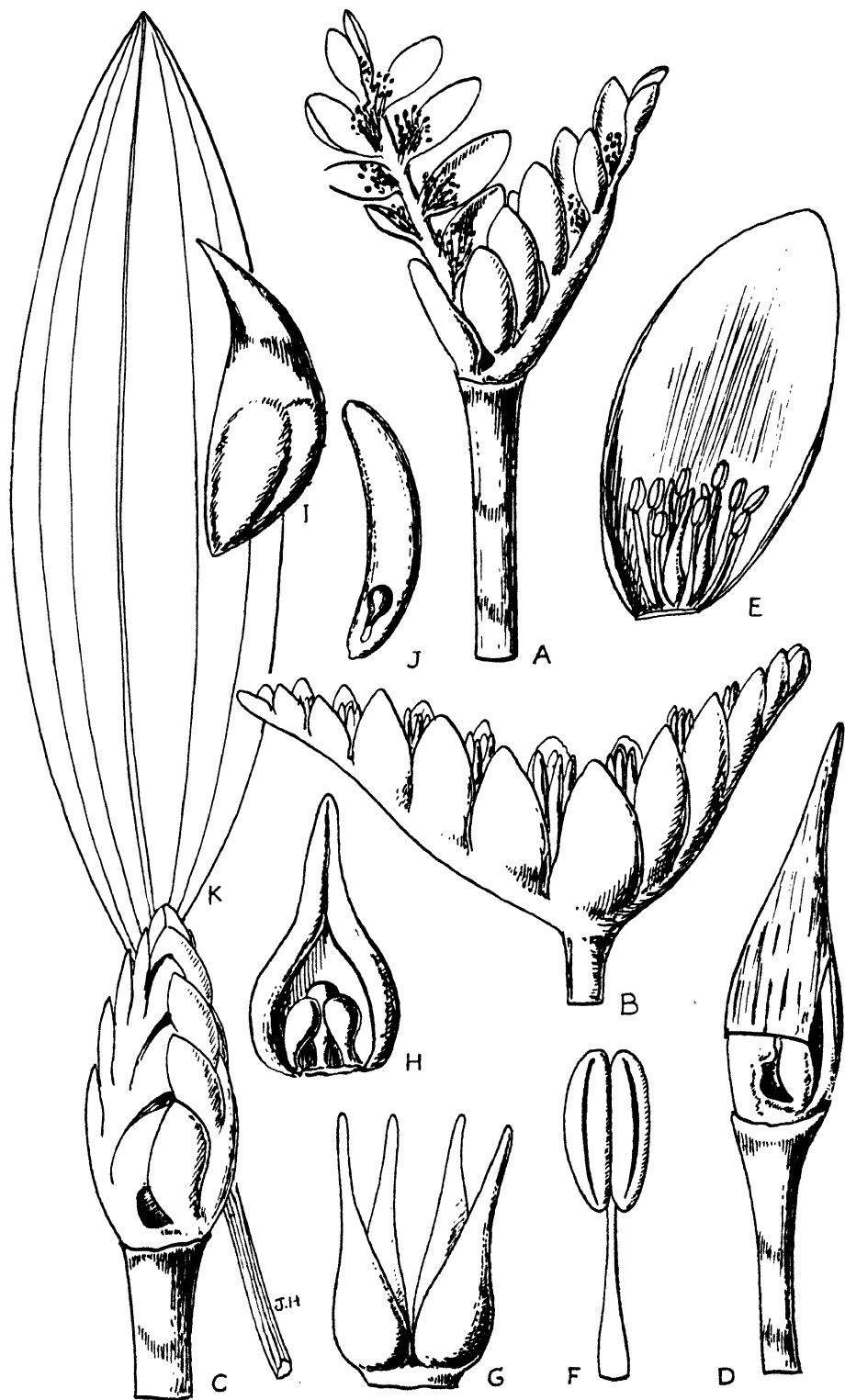


Grubbia rosmarinifolia Berg. (GRUBBIACEAE).

A, shows bases of opposite leaves; A1, upper and lower surface of leaves; B, flower from above; C, vertical section of flower; D, stamen. (From the author's *Families of Flowering Plants*.)

Aponogeton distachyon Linn f. (APONOGETONACEAE), from the Cape Peninsula (often cultivated in our ponds, shown on next page).

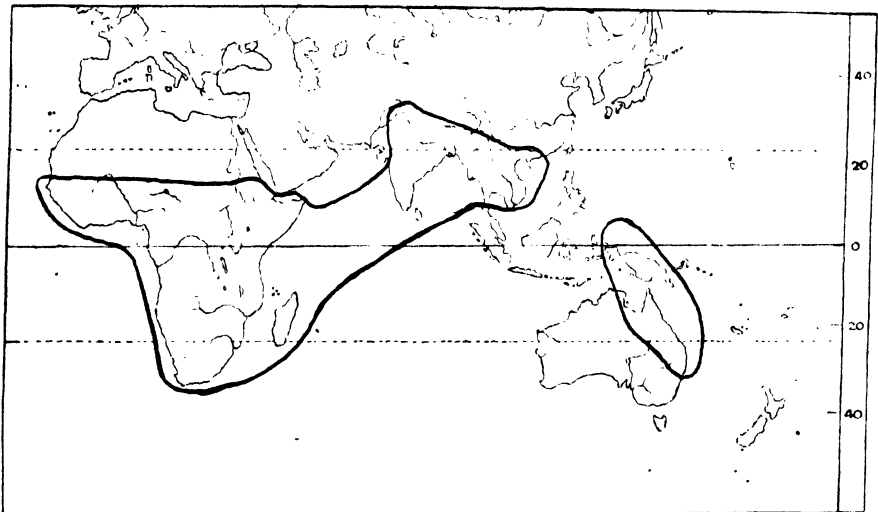
A, inflorescence, showing bract-like perianth-segments; B, the same in fruit; C, same in bud after fall of spathe-like bract; D, same with bract, just before falling; E, flower; F, stamen; H, carpel from within; I, seed; J, embryo. [From the author's *Families of Flowering Plants*, 2 : 44 (1934).]



A more advanced family is ZOSTERACEAE, found on the eastern coasts of South Africa. *Zostera* grows in sea-water (submerged), and is one of the very few wholly maritime genera of flowering plants. In this family the limit of reduction has been reached, the male flowers consisting of a single unilocular anther, and the female of one carpel, being a greater reduction even than *Euphorbia*.

A very beautiful Amaryllidaceous plant confined to the Cape Peninsula is that which has been known for about 150 years as *Amaryllis Belladonna* Linn., whose name has been recently threatened,¹ but later re-established.² Botanists are not in agreement about this.

In connection with the flora of the Peninsula may be mentioned two genera of Conifers which are found on Table Mountain. The group formerly known as CONIFERAE, now variously split into several smaller



Range of the genus *Aponogeton* (APONOGETONACEAE).

families, is represented in South Africa by two genera and twelve species. There are six species of *Podocarpus* (TAXACEAE), which are not easy to separate by very definite characters. *P. latifolius* R. Br. is a tree up to 100 ft. high, and one of the most valuable timber trees of South Africa; commonly known as Yellow Wood. It occurs on Table Mountain and through the south and eastern forests to the Transvaal. *P. falcatus* R. Br., the Bastard or Outeniqua Yellow Wood, ranges from Swellendam to Portuguese East Africa. *P. gracilior* Pilger occurs in the Northern Transvaal and throughout east tropical Africa as far as Abyssinia. The genus *Podocarpus* consists of about seventy species, most of them in the mountain forests of the tropics.

CUPRESSACEAE are represented by *Widdringtonia*, a genus endemic in Southern Africa. The six species are confined to South Africa, with the exception of *W. Whytei* Rendle, which extends to Eastern Rhodesia and Nyasaland. *W. cupressoides* Endl. grows on Table Mountain,

¹ See the American journal *Herbertia*, 1938 : 101-109.

² Sealy in *Kew Bulletin*, 1939 : 49.

and occurs in the forests as far eastward as the King Williamstown Division. An isolated species is the Cedar-boom or Cape Cedar, *W. juniperoides* Endl., which is known only from the Cedarberg Mountains in the Clanwilliam Division, mainly between 3000 and 6500 ft. It is a valuable, though rather small timber tree.

The Origin and Affinities of the South African Coast Region Flora

This subject has been dealt with by various writers. Probably the best and most comprehensive account is that of Schönland (1907), and I shall deal with the question only on general lines.

To one who is very familiar with the whole flora of Tropical Africa, as I am, and with a fair working knowledge of that of the North Temperate Zone, including the Himalaya-Chinese flora, that of at least a portion of South Africa *appears at once strange and alien*.

Except for a few stragglers along the eastern mountains and on the high plateaux, we have nothing in Tropical Africa, and certainly nothing in the Northern Hemisphere, like the PROTEACEAE, the BRUNIACEAE, the RESTIONACEAE, and the genera *Mesembryanthemum* (sensu lato), *Pelargonium* and *Erica*, to quote only a few examples. It seems probable, therefore, that these and other smaller groups peculiar to South Africa, and some also to Australia, are *austral types evolved independently in the Southern Hemisphere*.

Schönland quotes Hooker's apt statement: "The many bonds of affinity between the three Southern Floras—the Australian, Antarctic, and South African—indicate that these may all have been members of one great vegetation, which may once have covered as large a southern area as the European does a northern. . . . The geographical changes which have resulted in its dismemberment into isolated groups over the southern ocean must have been great indeed."

It is quite obvious that these austral groups have attempted to spread northwards, but they have nowhere become dominant over the more vigorous boreal flora. Examples are *Protea*, which reaches Abyssinia, and *Pelargonium*, which extends as far north as Arabia. *Erica* is, of course, an exception, but there are very few species north of the equator. A striking type of the boreal flora in the Knysna forests is *Trichocladus* (HAMAMELIDACEAE), whilst CORNACEAE (*Afrocrania*) and *Berberis* penetrate south into the East African mountains beyond the equator, to quote only a few examples.

The relationship between the flora of this south-western part of South Africa and that of Australia has been commented on by many writers. This is shown by the dominance of such remarkable families as PROTEACEAE and RESTIONACEAE (see map on p. 136), the bulk of them occurring in the two areas. A study of the distribution of these two families alone, therefore, reveals much to support Wegener's hypothesis of drifting continents, commented on in the introductory chapter to this book (see p. 12).

In this connection it will be of interest to remind South Africans of what Field-Marshal Smuts, that great statesman, philosopher, and *botanist*, said of the Wegener idea in his Presidential Address to the South African Association for the Advancement of Science, delivered at Oudtshoorn, Cape Province, on 6th July, 1925 :—

"The Wegener hypothesis purports to explain the origin, the past and the present of all the continents and oceans of this globe. But for us in South Africa it has a special interest in its account of the origin and distribution of continents in the southern hemisphere. Whether this account is correct or not, the hypothesis has the great merit of focussing attention on many great problems which call for explanation; and it has the further merit of associating these problems and making them parts and aspects of a great common scheme, instead of merely leaving them, as disjointed unconnected items, scattered haphazard over the various special sciences.

"For us in this part of the world, the most interesting feature of the scheme is that in it Africa assumes a central position among the continents; it becomes, in fact, the great 'divide' among the continents of the southern hemisphere; it appears as the mother continent from which South America on one side, and Madagascar, India, Australasia and their surrounding areas on the other, have split off and drifted away, have calved off, so to speak. The evidence for all this is strong; but it may well be that the evidence is yet insufficient to account for the whole Wegener hypothesis. It may not be strong enough to prove the actual disruption and separation of the continents in the past which is the essence of the hypothesis. But even so it may be right in assigning to the African continent a central determining position in respect of many of the great unsolved problems of geographical distribution, and in making that position the key which science will have to use in ever-increasing measure if it wishes to unlock the door to future advances. The value of a hypothesis often depends not so much on its correctness as on its fruitfulness. For the present I am prepared to look upon Wegener's hypothesis as a fruitful point of view more than a solution, as a suggestive line of thought and research along which useful work may be done in the future.

"One important line of research which it suggests to us is the east/west aspect in addition to the hitherto prevalent north/south line of orientation. Hitherto it is the European affiliations which have guided our thought and our research; we have looked to the north for explanations as well as our origins. In future, on the lines of Wegener's speculations, we shall look more to east and west—to our affiliations with South America, India and Madagascar and Australasia, for the great connexions which can explain the problems of our past and present. We shall look upon southern Africa as the centre of the southern hemisphere and correlate all the relevant scientific problems of this hemisphere from that new point of view. This new aspect will establish new contacts, and it is generally such new contacts which prove fruitful and creative for scientific progress.

"Let me first take the case of geology, a science in which a very high standard of success and excellence has been achieved in South Africa. A great amount of attention has been devoted to the question of the correlation of our geological formations with those of Europe, and although many unsolved problems still remain, the main outlines of the correspondence of our formations with those of the northern hemisphere have been successfully worked out. A good deal has been done, yet quite insufficient to correlate our formations with those of South America, India or Australasia.

"Yet it is evident that the subject is one of profound interest, both from a scientific and a practical point of view. Several of our formations at the Cape seem to be continued or paralleled by identical or similar formations in India and South America. A proper correlation of the geological systems may lead to most interesting results, and may also throw great light on the past of the three continents. We may thereby be enabled to explain just why they are practically the sole producers of the world's diamonds; why the diamond-fields of South-West Africa are situated on one edge of the Atlantic and those of Brazil on the other; why the coal-fields of these three countries and of Australia are confined to the eastern halves of each of these land masses; and why the curious and ancient banded-ironstones are so widely spread in South Africa, Brazil, peninsular India and Western Australia, though absent from Europe. The results of such a comparative study for the southern hemisphere might be most valuable and might settle many of the problems which still agitate science as to the past of the earth.

"It is when we come to the biological sciences, however, that such a comparative study promises the most fruitful results. Here there is a number of momentous problems still awaiting solution. Consider, for example, the problems affecting our botany. We have two distinct floras in South Africa; one, the South African flora which covers most of sub-tropical Africa and is clearly of tropical origin; the other, a temperate flora, found only in the south-west of the Cape Province on the seaward side of the first great mountain barrier, with outliers extending to the north along the mountain systems into the tropics. The two floras are apparently quite different and distinct and are engaged in a mortal conflict with each other, in which the temperate or Cape flora is slowly losing ground. This Cape flora forms indeed a problem of profound and baffling interest. What is its origin, and what its relation to the South African flora? The South African flora is, as I have said, clearly of tropical origin, and consists largely of sub-tropical derivations and modifications of the tropical forms found farther north in the equatorial regions. Can its origin be traced further back? In the answer to this question we meet again with what I may call the European fallacy, or the fallacy of the European origin. The current idea among botanists is that northern Europe is the source and the north temperate flora of Europe is the origin of both our South African and Cape floras. The north temperate flora of Europe is supposed to have been driven south by the onset of the last great Ice Age in Europe and, in the much cooler climate of the tropics at that time, to have migrated southward along the eastern mountain systems of Africa until southern Africa was reached.

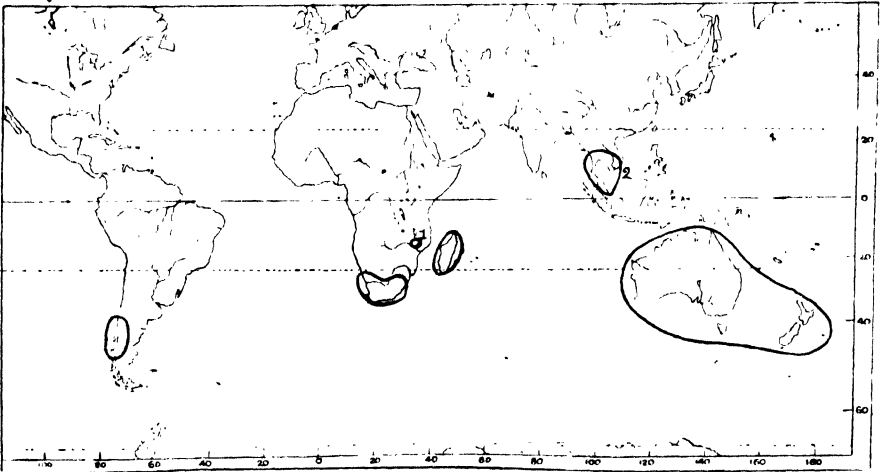
"This common view of the European origin of our floras will, however, require very careful reconsideration from the viewpoint which I am suggesting here. The correlation of our floras with the other floras of the southern hemisphere may profoundly affect this question of origins, and may throw much fresh light not only on the origin of our floras in Southern Africa, but even on so momentous a question as the origin of the flowering plants and on geographical distribution generally. Even according to our present knowledge, the African floras do not seem to fit in well with the current view of their origin. Apart from the Cape flora in the extreme south, and the Mediterranean temperate flora in the extreme north, the African flora—better known as the Tropical African flora or the Palaeo-tropical African flora—covers the rest of the continent. In this flora an element predominates which is peculiar to this part of the world, but is more or less closely related to the floras of India, Madagascar, Australasia and South America. In other words, the special affiliations of the Tropical African flora are in the southern hemisphere. Similarly the Cape flora has peculiar affiliations with the floras of certain countries in the southern hemisphere. The current view of the northern origin may therefore not be the last word so far as botany is concerned.

"On this question we have the following two interesting facts. First, the fact already mentioned that the chief types of the African flora have their affiliations in the southern and not in the northern hemisphere. Secondly, the fact that the chief types of the present Cape flora, such as the *PROTEACEAE*, *RUTACEAE*, and *RESTIACEAE*, to-day occupy the areas that correspond to the former Gondwanaland, that is to say, exactly the same area which was covered by the *Glossopteris* flora in Mesozoic times. It is alleged that some fossil types of *PROTEACEAE* have been found in Central Europe in lower Cretaceous deposits, but these finds are disputed. These two facts would seem to point to the conclusion that the two African floras are probably of southern origin and have not been derived from the northern or European flora. Nay, more, the suggestion of Seward that the Mesozoic flora of Europe, which is markedly dissimilar from that of its Palaeozoic flora, may have had a southern origin in Gondwanaland, opens up very interesting possibilities. Indeed, in the palaeobotany of the southern hemisphere we are only at the beginnings; and who knows whether further discoveries in this largely virgin field of research may not yet give point and substance to Darwin's surmise that the existence far back in the long ages of an extremely isolated Southern Continent is somehow to be linked with the mysterious origin of flowering plants.

Some of the greatest problems of botany, of geographical distribution,

and of the past of the earth will have to wait for their solution until palaeobotany has made much further advances in South Africa and the southern hemisphere generally. In this connexion a great opportunity lies before science in South Africa. I trust a step will be taken by the establishment of a chair of palaeobotany at one or other of our South African universities. It will be a small step, but its significance will be great and its results may be far-reaching.

So far I have only referred to the evidence of palaeobotany. But the evidence of our southern palaeontology generally is all in the same direction. Still more so is the evidence of the present botanical distribution throughout the southern hemisphere. The present distribution is not only strong presumptive evidence in favour either of a great Southern Continent or great land connexions in the south in the past, but also in favour of the independent origin of the African flora. Dr. Otto Stapf, whose knowledge of African grasses is unrivalled, goes even further in his masterly 'Gräser der Sud Afrikas', and would seem to suggest that very special importance is to be attached to the unique character of the Cape flora as distinguished from the African flora. The Cape flora points not only to a southern origin but to an origin even farther south than the ancient Gondwanaland is commonly supposed to have extended. May we not venture the suggestion that the Cape temperate flora is the survival of an Antarctic and sub-Antarctic flora which has perished in the climatic changes of the past? That, at any rate, would account for its marked differences from our sub-tropical South African flora."



Range of the family RESTIONACEAE. (1) *Hypolaena Mahoni* in Nyasaland. (2) *Leptocarpus* in Cochinchina, Siam, and the Malay Peninsula, and in Chile, growing in abundance on sandy shores. In Madagascar there is only one species, *Restio madagascariensis* Chermesz, this genus occurring both in South Africa and Australia.

In the case of the PROTEACEAE it should be noted especially that the same genus is not found both in South Africa and Australia, and even the tribes are not the same. As regards the relative age from a phylogenetic standpoint, the South African representatives seem to be on the whole more advanced than the Australian. Such genera as *Leucadendron*, which is dioecious, with the flowers arranged in cone-like heads, and *Protea*, with its composite-like heads, are equivalent in a broad sense to the Alders (*Alnus*) and the COMPOSITAE, respectively.

It is difficult to believe in the mythical "Gondwanaland" of Suess, who supposed that there existed at one time a vast land surface between Africa, India, and Australia, which has now disappeared under the sea. It seems quite feasible, however, that Australia, India, Madagascar, and South Africa were at one time part of a vast antarctic continent which has broken up and of which only fragments remain. For there are several interesting connections between the floras of Madagascar and Ceylon, and even between Madagascar and Australia. A few years ago Professor Humbert, of the Paris Museum, collected in Madagascar a species of plant which is to all intents and purposes an *Olearia*, a close relative of *Aster* formerly known only from Australasia. There is also a connection indicated by the distinct Dilleniaceous genus *Hibbertia*, with two species in Madagascar and the remainder in Australia. A glance at the map showing the range of the family RESTIONACEAE reveals some interesting points. It is very similar to the distribution of the PROTEACEAE.

The few maps scattered throughout this book will illustrate these points and draw the attention of the student to this wonderfully interesting branch of phytogeography.

Chapter IX

TOUR OF NAMAQUALAND AND BUSHMANLAND

ON Monday evening, 8th October, Mr. Pillans and I left Cape Town by the 8.10 train for Matjesfontein, where we arrived at seven o'clock the next morning. Our botanical outfit cost us something for excess baggage, railway officials having no sympathy for botanists and their impedimenta. I met Mr. James Logan for the second time, and we were not long in proceeding to pack up our things on his magnificent Studebaker eight-seater saloon car, which he was generously using for our trip to Namaqualand and the Orange River.

We started off at ten o'clock, by the road to Sutherland. The country for some miles was covered with large quantities of *Galaxia* and *Elytropappus*. At one spot we passed a herd of sheep with big fat tails, which act as a reserve in time of drought, or so I was told ! On each side of the road were nice little kopjes, some with very roughly jagged edges. We observed numerous plants of *Euphorbia mauritanica* (at 4 miles) and bushes of *Mesembryanthemum calamiforme* and *Cotyledon Wallichii*, the country hereabouts being extremely dry. Along the dried-up water-courses were old trees (only) of *Rhus viminalis*. At 8 miles from Matjesfontein we approached small and peculiar flat-topped hills, with *Melanthus minor* in the dry water-courses. The cone-shaped hills had often a wall of gypsum around the uppermost portion, like a collar.

I have a note that so far the road had been quite good. Repeatedly the dry water-courses furnished some interesting vegetation, contrasting sharply with that of the hills; we passed large trees of *Euclea*, about 20 ft. high, and *Acacia Karroo*. Hereabouts there were also great masses of a species of *Pteronia*, poisonous to stock at certain times of the year. At 13 miles we entered higher hills with small trees of *Gymnosporia* on the slopes, and, steadily climbing, also numerous scattered examples of *Euclea undulata*, at 16 miles, among rough boulders. At 18 miles we mounted the top of a hill with extensive views of undulating country, very dry indeed, and with no decent-sized bush or tree in sight. An interesting object in this lonely country was a post-bag hanging by the roadside, which no doubt contained news of the outside world for the lonely farmhouse which it served—so far from Cape Town and so very, very far from London ! Yet the post bridges the distance in twenty days or so, and now, by Air-Mail, in little over a week.

Among several interesting plants collected hereabouts ¹ was *Aster*

¹ Collected between Matjesfontein and Sutherland, 9th October, 1928 : No. 673, *Aster tenellus* Linn., a tiny annual with linear ciliate leaves and beautiful blue ray-flowers; 674, *Galenia secunda* Sond., with scurfy leaves and light-crimson flowers; 675, *Arctotis* sp.; 676, *Heliophila suarivissima* Burch., leaves linear-acicular, glabrous; flowers white; fruit linear, 6 cm. long; 677, *Diascia parviflora* Benth., leaves opposite, ovate, toothed; flowers maroon; 678, *Poa bulbosa* L., var. *vivipara*, tufted, about 20 cm. high; spikelets tinged with mauve; 679a, *Aster namaquanus* Harv., annual; leaves narrowly oblanceolate, basal, with scape-like peduncle supporting rather large blue flower-heads; 680

filifolius Vent. (No. 679), a shrub with acicular glabrous leaves and numerous heads of deep sky-blue ray-flowers; and an *Aster*, which seems to be undescribed and which is described below as *A. minimus*¹ on account of its diminutive size, being only 6–7 cm. high, with very tiny pale-yellow ray-flowers. *Senecio capilifolius* DC. (No. 680), an annual with pinnately divided leaves and numerous heads with mauve-magenta rays; the real *Senecio Burchellii* DC. (No. 681), exactly equal to the type discovered by Burchell (No. 1438) in August 1811, between Quaggas Fontein and Dwaal River, in the neighbouring district of Fraserburg. Not all the plants assigned to this in herbaria belong to the species, which is woody at the base, with pale-yellow ray-flowers.

Another plant which proved to be unnamed at the time of collection was our No. 685, a pretty species of *Ixia*, recently described by Miss Lewis,² and figured in the *Flowering Plants of South Africa* as *Ixia trifolia* Lewis. The type specimen came from Tweedside, in the Laingsburg district.

During this day's trip through the Roggeveld we were lucky enough to collect a very interesting plant, *Acaena latebrosa* Ait. (No. 691). This genus belongs to the family ROSACEAE, and resembles *Poterium* from the Northern Hemisphere. *Acaena* is austral, however, occurring

(see above); 681 (see above); 682, *Walafrida rigida* (Rolfe) Hutch., a shrub 1½–2 ft., with fascicles of small ericoid leaves and close short spikes of pale-mauve flowers; 683, *Nemesia versicolor* Benth.; 684, *Senecio robertifolius* DC., with lyrate basal leaves and a few pinnately partite stem-leaves and rather large flower-heads with yellow rays; this species is closely allied to and sometimes confused with *S. erosus* from the lower regions of the Cape; 685 (see above); 686, *Ursinia annua* Less., with yellow rays; 687, *Polygala leptophylla* DC., dwarf and shrubby; leaves oblong, puberulous; flowers few, mauve; 688, *Aster namaquanus* Harv. (see No. 679a); 689, *Dimorphotheca* prob. new sp., prostrate annual, scabrid-pubescent; fruiting heads with prickly achenes; 690, *Arctotis sulcocarpa* Lewin, with pinnately partite leaves thinly cobwebby below, rays pale lemon-yellow above; 691 (see above); 692, *Chrysocoma coma-aurea* Linn., with ericoid curved leaves and rather numerous small heads of yellow flowers; 693 (see next page); 694 (see next page); 695, *Chrysocoma ciliata* L., a typical "suffrutex", short acicular leaves slightly hispidulous and shortly pedunculate heads of pale-yellow flowers; 697, *Indigofera heterophylla* Thunb., with semi-prostrate branches from a thick woody stem, trifoliolate leaves and short close racemes; 698 (see next page); 699, *Chrysocoma oblongifolia* DC. (see 695); 700, *Steirodiscus linearilobus* DC., dainty little annual, leaves pinnately divided into filiform segments; heads yellow (see figure, p. 140); 701, *Ursinia pilifera* Less., a beautiful species with white rays, red-brown below; 702 (see next page). Families represented by above: --COMPOSITAE: Nos. 673, 675, 679a, 684, 686, 688, 689, 690, 692, 695, 699, 700, 701. FICOIDACEAE: 674. CRUCIFERAE: 676. SCROPHULARIACEAE: 677, 683. GRAMINEAE: 678. SELAGINACEAE: 682. POLYGALACEAE: 687. PAPILIONACEAE: 697.

¹ *Aster minimus* Hutch. sp. nov. affinis *A. adfni* Less. sed floribus radiis flavis et multo minoribus differt.

Herba annua usque ad 9 cm. alta. Folia anguste oblanceolata, apice rotundata, basi angustata, majora 2 cm. longa et 6 mm. lata, uninervia, dense pubescentia. Pedunculi geniculati, 2–3 cm. longi, tenuiter pubescentes. Involucri bractearum 5–6 mm. longae, 2-seriatae, exteriores lineares et vix marginatae, inferiores oblongo-ellipticae et marginibus late hyalinis, omnes dorso pilosae. Flores radii minimi, flavi. Achaenia compressa, obovata, nigrescentia, parce pubescentia, 3 mm. longa, marginibus incrassatis.

Sutherland Div.: Between Matjesfontein and Sutherland, 9th October, 1928, Hutchinson 696 (type in Kew Herbarium).

Assistant in the Bolus Herbarium.

in New Zealand, Australia, South Africa (1 or 2 spp.), Tristan da Cunha, and in South America from Tierra del Fuego along the Andes as far north as California. This interesting distribution (see map, p. 142)

corresponds more or less with that of the family PROTEACEAE, although the latter does not reach so far north as California.

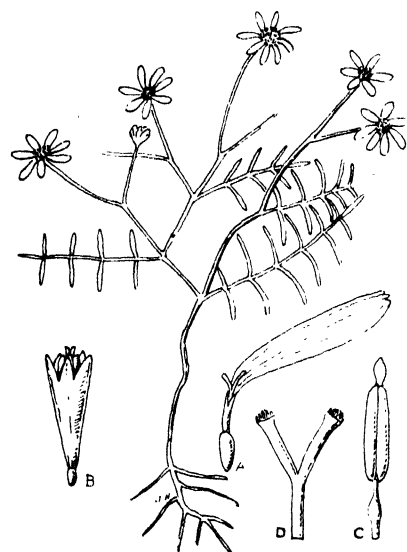
In addition, we were fortunate to rediscover another undescribed species which I have called *Lasiospermum poteriodes* Hutch.¹, collected by Burchell in this region, and represented by his Nos. 1325, 1336, 1404, our number being 693.

We were lucky to come across a very rare *Pteronia*, also only previously gathered by Burchell, at Klein Quaggas Fontein, near Fraserburg, in August 1811. This was our No. 694, which proved to be *Pteronia aspalatha* DC., of which I give a small sketch.

Our No. 698, an undescribed species of *Nestlera*, was collected in this district by Mrs. (now Dr.) Levyns in September 1926, and it gives me much pleasure to name the species after this keen and energetic botanist *Nestlera Levynsae* Hutch. sp. nov.²

Steirodiscus linearilobus D.C., a dainty little annual Composite from the Roggeveld.

A, ray-flower; B, disk-flower; C, stamen; D, style-arms.



Another most interesting plant we collected twice—No. 702 from between Matjesfontein and Sutherland, and No. 718 from between Sutherland and Middlepost. This is a new species of *Walafrida*, *W. Loganii*

¹ *Lasiospermum poteriodes* Hutch. sp. nov.

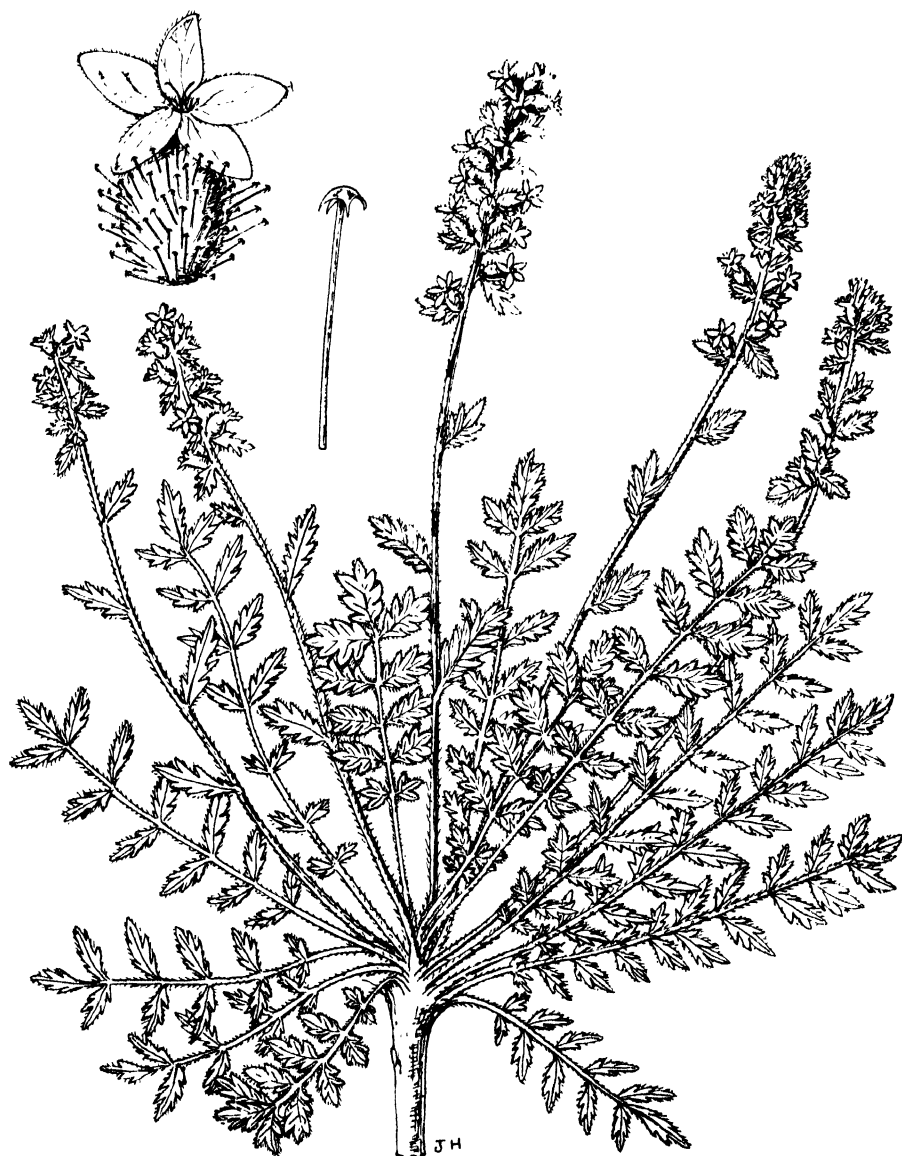
Rhizoma ramosum, radicibus crassis, ramis apicem versus dense villosis. Caules ascendentes vel subprostrati, fere 5 mm. crassi, glabrescentes. Folia pinnatipartita, usque ad 6 cm. longa et 1.3 cm. lata, tenuiter pilosa, demum glabra, segmentis integris vel pinnatipartitis oblanceolatis apice callosio-mucronatis; petioli amplexicaules, lobulato-dentati. Capitula depresso-globosa, flore 1.5 cm., fructu 2 cm. diametro; pedunculi apice tomentosi. Involucri bracteae 3-4-seriatae, late ovatae, ab exterioribus gradatim majores, marginibus hyalinis. Flores numerosi, pallide flavi. Achaenia dense lanata.

Sutherland Div.: between Matjesfontein and Sutherland, prostrate, heads pale yellow, 9th October, 1928, *Hutchinson* 693 (type in Kew Herbarium); between Jackal's Fontein and Kuilenberg, near Sutherland, 8th August, 1811, *Burchell* 1325, 1336; near Karree River, 26th August, 1811, *Burchell* 1404.

² *Nestlera Levynsae* Hutch. sp. nov.

Suffrutex 0.75 m. altus; ramuli ultimi brevissimi, dense foliati. Folia ericoidea, obtusa, 3-4 mm. longa, infra sulcata, tenuiter lanuginosa. Capitula solitaria, terminalia, cylindrica, circiter 1 cm. longa. Involucri bracteae 5-6-seriatae, glabrae, exterioribus late ovatis brevibus interioribus oblongo-oblanceolatis omnibus marginibus hyalinis. Flores radii 3-4, flavi; corollae tubus 2 mm. longus; lamina bifida, 3 mm. longa. Flores disci pauci; corollae tubus glaber. Achaenia glabra, setis liberis laevibus subulatis coronata.

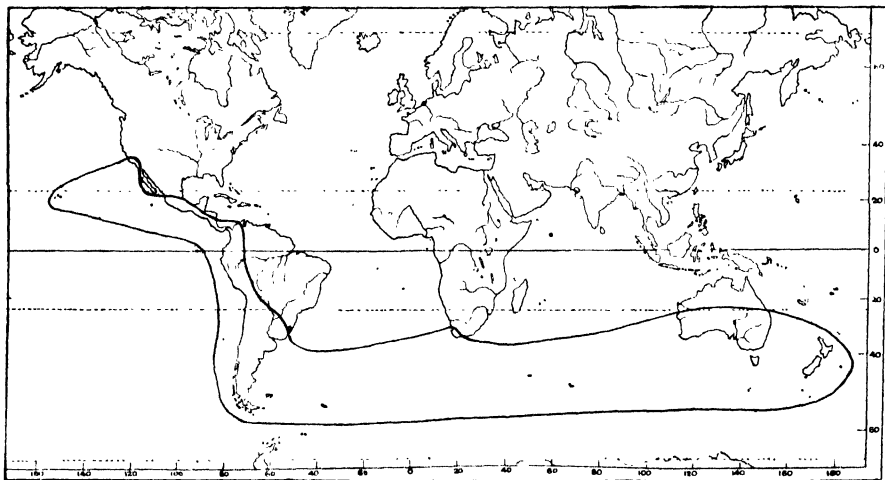
Sutherland Div.: Top of Verlaten Kloof, frequent, 10th September, 1926, *Mrs. Levyns* 1649 (type in Kew Herbarium.); between Matjesfontein and Sutherland, common, 9th October, 1928, *Hutchinson* 698.



Acaena latebrosa Ait. (ROSACEAE), belonging to a genus with an interesting distribution (see p. 139 and map on p. 142).

Hutch.,¹ and is closely allied to *W. rigida* (Rolfe) Hutch.², the latter included by Rolfe in the *Flora Capensis* under *Selago*, but undoubtedly belonging to *Walafrida*, from the construction of the calyx, which is 3-lobed, with the bract partially adnate. I have much pleasure in naming this after Mr. J. Logan, who so generously accompanied us on this trip to Namaqualand. *W. rigida* is also known only from the Sutherland division.

At 20 miles from Matjesfontein (and still towards Sutherland) we passed through a wide expanse of *Chrysocoma*, and "sheets" of *Mesem-*



Range of *Acaena*, an austral genus of ROSACEAE allied to the boreal genus *Poterium*, and representing a more or less parallel group.

bryanthemum in full flower, and looking rather like heather in the distance. At 24 miles, as we passed into the Klein Roggeveld, *Euryops lateriflorus* Less. (No. 703) occurred in great quantity, and presently we noted numerous plants of the tall *Urginea altissima*, which I have since found ranges right up into Upper Guinea. At 20 miles we dropped down once more into the Karoo proper, where again the dried-up stream-beds were lined with *Acacia* and *Rhus*. Occasionally the dry veld was

¹ *Walafrida Loganii* Hutch. sp. nov. affinis *W. rigidae* (Rolfe) Hutch. sed robustior, foliis brevioribus et crassioribus, inflorescentia crassiore, floribus pallide caeruleis differt.

Frutex 0.75 m. altus; caulis cortice longitudinaliter fissus; rami dense foliati, pubescentes. Folia fasciculata, sessilia, subteretia, inaequalia, usque ad 3 mm. longa, glabra vel leviter pubescentia. Flores pallide caerulei; spicae breves, crebre bracteatae; bracteae ovato-oblongae, basi subcarinatae, circiter 5 mm. longae, ciliatae, extra breviter pubescentes. Calycis lobi 3, medio multo minore, lateralibus 3.5 mm. longis marginibus membranaceis pilis reflexis pubescentibus. Corollae tubus 5 mm. longus, glaber; lobi 5, 2 adaxialibus alte connatis. Stamina longe exserta. Ovarium oblongum, glabrum; stylus 5 mm. longus, breviter bilobatus.

Sutherland Div.: Between Matjesfontein and Sutherland, flowers mauve, 9th October, 1928, *Hutchinson* 702 (type in Kew Herbarium); between Sutherland and Middlepost, flowers mauve, *Hutchinson* 718.

² *Walafrida rigida* Hutch. comb. nov. (*Selago rigida* Rolfe).

brightened by a solitary bush of *Mesembryanthemum spinosum* or *M. Zeyheri*—very similar species, but the latter with the larger flowers.

About 40 miles on our journey we entered a perfect flower-garden of *Mesembryanthemum*, whilst at 50 miles this genus covered the whole country for miles and miles—a wonderful sight to a botanist who had only seen rather miserable specimens in pots in a glasshouse.

Presently we passed through Verlaten Kloof, described by Burchell, and I must confess to feeling a thrill as I followed in the footsteps of the great collector.

Shortly after passing through the small town of Sutherland we were refreshed by the sight of large areas of *Homeria collina*, with salmon and yellow flowers, and at 90 miles the whole valley was



Pteronia aspalatha DC. (COMPOSITAE), a rare species collected in the Roggeveld.

A, two leaves; B, outer and inner bracts; C, stamen; D, flower; E, pappus bristle; F, style-arms.

shimmering with pure salmon-coloured flowers, the yellow form having faded out. This first day¹ we had covered 126 miles through most weird and interesting country, and we stayed the night at Middlepost.

On Tuesday, 9th October, we took the road early for Calvinia, through many miles of undulating country full of dead or apparently dead *Pentzia*, the soil a loose sand. Presently we saw an abundance of *Euphorbia* of the candelabra type, and of *Chrysocoma*; the soil was very scanty, with hard rock below. Sixteen miles beyond Middlepost we found another *Homeria*, but with pink flowers, whilst a little farther (near Elandsfontein) we observed a small hill covered with scattered

¹ Collected between Sutherland and Middlepost, 9th October, 1928: No. 704, *Zaluzianskya villosa* F. W. Schmidt (SCROPHULARIACEAE); 705, *Leyssera tenella* DC. (COMPOSITAE); 706, *Rosenia glandulosa* Thunb. (COMPOSITAE); 707, *Lesseria inflata* Harv. (PAPILIONACEAE); 708, *Arctotis diffusa* Thunb. (COMPOSITAE); 710, *Senecio glutinosus* Thunb. (COMPOSITAE); 711, *Manulea fragrans* Schltr. (SCROPHULARIACEAE); 712, *Nemesia affinis* Benth. (SCROPHULARIACEAE); 714, *Phyllopodium pumilum* Benth. (SCROPHULARIACEAE); 715, *Pharnaceum croceum* Linn. (MOLLUGINACEAE).

plants of *Morea gigantea* Klatt (No. 721), with racemes of primrose-yellow flowers with an orange eye and spotted with green at the base.

On this day we collected, among other interesting plants enumerated below,¹ the following, which deserve special mention: No. 704, *Zaluzianskya villosa* F. W. Schmidt, a beautiful Scrophulariaceous annual with dense spikes of crimson flowers and an orange "eye", a lovely thing for greenhouse cultivation; No. 706, *Rosenia glandulosa* Thunb., collected in this same district by Dr. Levyns in 1926; originally discovered by Thunberg and re-collected by Burchell in the Fraserburg Division and by Dr. Shaw (see Oliv. in *Hook. Ic. Pl.* t. 2228); No. 707, *Lessertia inflata* Harv., a prostrate legume with densely pilose branches and leaves, purplish flowers, and bladder-like fruits; No. 708, a very rare *Arctotis*, *A. diffusa* Thunb., first collected by Thunberg, next by Burchell, No. 1327, in 1811, south of Sutherland, by Tyson at Murraysburg in 1878 and some years ago by Mr. Worsdell—it is a very small plant, with small canescent lyrate-spathulate leaves and thick roots from a short, hard rhizome; No. 709, *Pentzia*, which is the same as *Schlechter* 8846 from Matjes River in the Clanwilliam Division. This proves to be unnamed, so far as I have been able to ascertain, and I have described it below as *P. membranacea*,² the involucrel bracts having wide membranous margins.

Other plants gathered were *Venidium macrocephalum* DC. (COMPOSITAE) (No. 716), a stemless species with lyrate sparsely pubescent leaves and rich yellow rays without a spot; *Galenia sarcophylla* Fenzl (FICOIDACEAE) (No. 717), much branched and spreading, with small pale-yellow flowers; *Homeria salmonea* L. Bolus (IRIDACEAE) (No. 719), with salmon or yellow flowers arranged in a corymb-like inflorescence; and *Hirpicium alienatum* (L. f.) Druce (COMPOSITAE) (No. 720), a very woody-based plant with short branchlets and small setulose leaves.

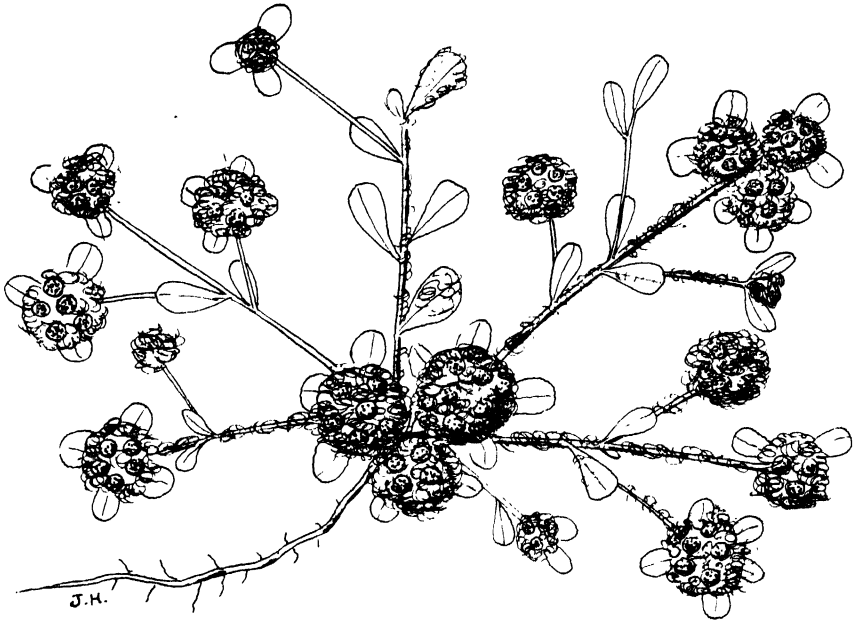
At 19 miles from Middlepost I was delighted to collect beautiful examples of the Composite genus *Eriosphaera* (*E. Oculus-Cati* Thunb.) (No. 724), in dry, stony ground. Surely here I was following the footsteps of another great collector in South Africa, Thunberg, for it was he who discovered this rare plant, which has rarely been gathered since.

¹ Collected near Elandsfontein, between Middlepost and Calvinia, 10th October: No. 721, *Morea gigantea* Klatt (see above); 722, *Diascia floribunda* Grant; 723, *Hemimeris centrodes* Hiern; 724 (see above); 725, *Ursinia annua* Less.; 726, *Gnaphalium glomerulatum* Sond.; 727, *Lessertia annularis* Burch.; 728, *Diascia parviflora* Benth.; 729, *Polycarena collina* Hiern.; 730, *Nemesia Leipoldtii* Hiern.; 731, *Ixia incarnata* Jacq.; 732, *Venidium fugax* Harv.; 733, *Othonna arborescens* Linn. Families represented:—IRIDACEAE: Nos. 721, 731. SCROPHULARIACEAE: 722, 723, 728, 729, 730. COMPOSITAE: 725, 726, 732, 733. PAPILIONACEAE: 727.

² *Pentzia membranacea* Hutch. sp. nov. annua, foliis pinnatipartitis, involucri bracteis marginibus late membranaceis, pappo nullo distincta.

Herba annua e basi diffusa ramosa; rami parce pubescentes. Folia pinnatipartita, 1.5–2 cm. longa, segmentis linearibus integris vel interdum bilobatis breviter pubescentibus. Capitula solitaria, terminalia, pedunculata, pallide flava. Involucri bractee circiter 3-seriatae, gradatim longiores, interiores lineari-oblongae, marginibus late membranaceis, extra leviter lanatae. Receptaculum planum et latum. Corollae tubus 1.5 mm. longus, glaber. Achaenia glabra, pappo nullo.

Sutherland Div.: Between Sutherland and Middlepost, flowers pale yellow, 9th October, 1928, *Hutchinson* 709 (type in Kew Herbarium). Clanwilliam Div.: Matjes River, 800 m., *Schlechter* 8846.



Eriosphaera Oculus-Cati Less. (COMPOSITAE), from the Karoo; a rare species first collected by Thunberg.

At 21 miles we stopped to photograph some wonderful flat-topped mountains—"table-tops"—which occur here and there in this region (see below). They gave one the impression that aeons ago there had been a continuous high flat plateau in this part of Africa and that these table-topped mountains are the hard remnants. About here there was a complete absence of succulents, except the candelabra *Euphorbia*, which was ubiquitous.

We reached Calvinia by lunch-time, and called on the station-master, a keen succulent-grower. Much to my regret, he informed us that the Hantam Berg, a classical hunting-ground of Thunberg,



[Photogr. by the Author.]

The Great Karoo, typical of the Sutherland and Calvinia districts.



A roadside "café" in Namaqualand.



A Namaqualand shepherd.

[Photogr. by the Author.]

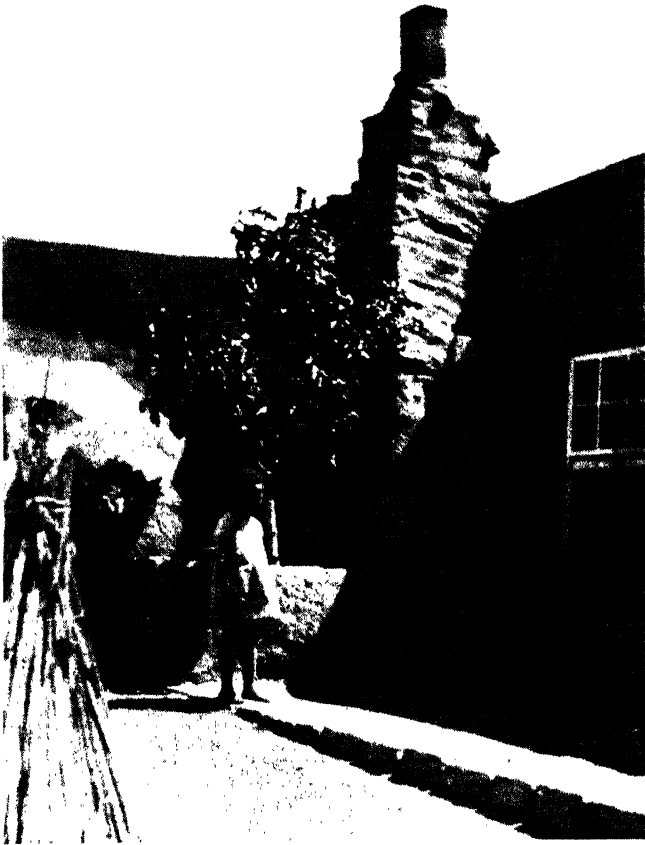


Boscia bush and N. S. Pillans.



Native oven, Namaqualand.

[Photogr. by the Author.]



A "little grey home" in Western South Africa.

was suffering from a prolonged drought and not worth visiting. I had looked forward to making a grand haul from the mountains and endeavouring to re-collect specimens to match the Thunberg types at Upsala. Disappointed in this, we proceeded to Nieuwoudtville¹ for the night, having travelled 53 miles and done a good deal of botanising on the way.

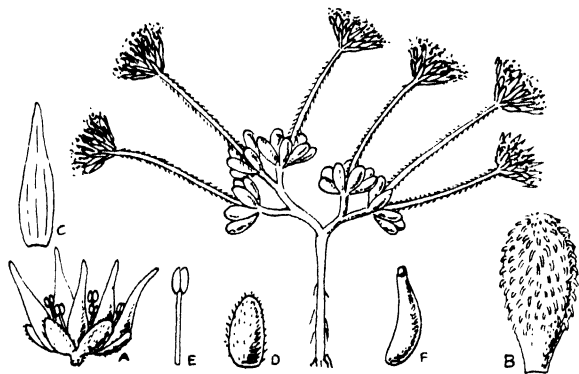
Near Nieuwoudtville we found a very small species of *Cotula* (No. 741), which I have failed to identify with any known species, and I have pleasure in calling it *Cotula Loganii* Hutch.², after Mr. James Logan, of Matjesfontein.

¹ Collected between Calvinia and Nieuwoudtville, 10th October, all COMPOSITAE: No. 734, *Berkheya carthamoides* Willd.; 735, *Berkheya atractyloides* Druce; 736, *Gorteria diffusa* Thunb.; 737, *Arctotis acaulis* Linn.; 738, *Othonna coronopifolia* Linn.; 740, *Senecio larius* DC.

² *Cotula Loganii* Hutch. sp. nov., annua minima, foliis pinnatipartitis cum pedunculis longe pilosis, involucri bracteis subuniseriatis valde distincta.

Herba annua, pumila, 3 cm. alta. Folia amplexicaulia, petiolata, pinnatipartita, segmentis linearibus acutis laxe pilosis. Capitula pluria; pedunculi 2-2.5 cm. longi, erecti, pilis patulis longis induti. Involucri bractee circiter 8, subuniseriatae, ovato-ellipticae, apice rotundatae, 3.5-4 mm. longae, 1-nerviae

Next day (10th October), shortly after leaving the village of Nieuwoudtville,¹ we arrived at the top of the Vanrhyns Pass in the Bokkeveld Mountains, where we explored the top and sides of the steep escarpment. Here Mr. Pillans, at any rate, knew where to look for some real treasures, some of them almost small enough to be sought for with a reading-glass. For example, in a small pan of rock about 5 ft. in circumference we found, in a very thin layer of soil, the following species : *Crassula Comptonii*² (No. 765), *Conophytum Comptonii*



Crassula Comptonii Hutch. et Pillans (CRASSULACEAE), a diminutive species from the top of the Vanrhyn's Pass.

A, flower; B, leaf; C, petal; D, sepal; E, stamen; F, carpel.

(sent alive to Kew), *Anacampteros Comptonii*—in fact very much Professor Compton here—and a tiny species of *Othonna* with a

extra pubescentes. Corollae tubus glaber, basi expansus. Achaenia fertilia pauca, compressa, anguste alata.

Calvinia Div.: Beyond Nieuwoudtville, 9th October, 1928, *Hutchinson* 741 (type in Kew Herbarium).

¹ Collected 3 miles north-west of Nieuwoudtville, 11th October: No. 742, *Satyrium bicornis* (L.) Thunb.; 743, *Silene clandestina* Jacq.; 744, *Nemesia versicolor* Benth.; 745, *Lessertia linearis* DC.; 746, *Lachenalia orchioidea* Ait.; 747, *Crassula alpestris* Thunb.; 748, *Lobostemon glaucophyllus* Buek; 749, *Leucadendron Meyerianum* Buek; 750, *Dimorphotheca graminifolia* (L.) DC.; 751, *Rethania scdifolia* Harv.

Collected 5 miles north-west of Nieuwoudtville, 11th October: 752, *Gladiolus* sp., with greenish-brown flowers streaked with red-brown; 753, *Selago* sp., flowers white; shrublet up to 15 in. high; 754, *Paranomus spicatus* (Berg.) O. Kuntze, very beautiful, up to 7 ft. high, flowers mauve-pink, like bottle-brushes; 755, *Leucadendron sericecephalum* Schltr., male heads creamy-yellow, female bracts brown, tomentose; leaves oblanceolate, silky at first; 756, *Rhus* sp.; 757, *Cullumia rigida* DC. (COMPOSITAE).

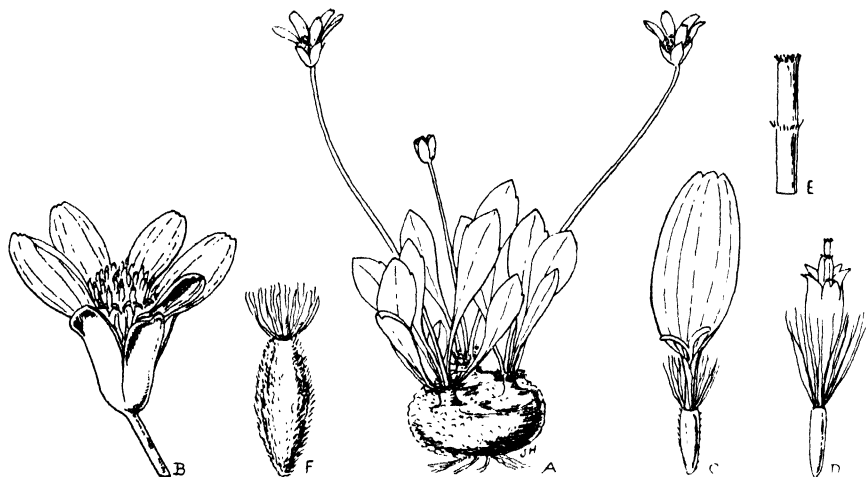
² *Crassula Comptonii* Hutch. et Pillans sp. nov. minima, affinis *C. namaquensis* Schönl. et Bak. f., sed multo minor, foliis minoribus turgidis et subteretibus differt.

Radix primaria verticalis, satis crassa; caulis nullus vel subnullus. Folia rosulata, carnosa, obovoidea, setulis semiimmersis reflexis induta. Flores capitati, pallide flavi; pedunculi usque ad 3 cm. longi, setulis reflexis induti. Sepala oblonga, dense ciliata. Petala lineari-lanceolata pallide flava, glabra. Stamina petala multo breviora. Carpella glabra.

Vanrhynsdorp Div.: Top of Vanrhyns Pass, in shallow pans on rock, 11th October, 1928, *Hutchinson* 765 (type in Kew Herbarium); 28th September, 1931, *Salter* 1608.

globose tuber which proved to be new, and which I have called *O. Pillansii*¹ (see below). We also collected fruiting specimens of *Rhopalota aphylla* N.E. Br. (CRASSULACEAE) (No. 768), at that time called *Crassula aphylla*.

The face of the escarpment itself provided so much new material, and so good was the locality in general, that we determined to stay the night. Not far away, by the side of the road, we examined a deserted hut which had evidently been used as a small store, and we took possession. After cutting some brushwood to soften the hardness of the



Othonna Pillansii Hutch. (COMPOSITAE), a new species from the top of the Vanrhyns Pass.

A, whole plant; B, flower-head; C, ray-flower; D, disk-flower; E, upper part of style and stigma.

floor, we prepared an evening meal. On our arrival, squatted in front of the hut were several families of Hottentots, some of whom were performing their toilet, some feeding and others attending to the little children. An old grey-bearded man, who might have stepped right out of *Uncle Tom's Cabin*, lay in the middle, resting. As quickly as I could I got out my camera to photograph the picturesque group, and whilst up to that moment there had been dead silence, pandemonium was now let loose. The women rushed to the old cart to get out their Sunday best and to comb their hair, some smacked the children and proceeded to smarten them up, and altogether there was a great

¹ *Othonna Pillansii* Hutch. sp. nov., planta minima acaulescens, tubero depresso-globoso, foliis spatulato-oblancoelatis integris vel 1-2-dentatis, pedunculis unicapitatis valde distincta.

Tuber depresso-globosus, 2-3 cm. diametro, apice lanatus, radicibus crassis elongatis. Folia rosulata, spatulato-oblancoelata, integra vel 1-2-dentata, 1-1.5 cm. longa, 4-6 mm. lata (cultu multo majora), coriacea, glabra. Pedunculi scaposi, 6-8 cm. longi, glabri. Involucri bracteae 4-5, anguste obovatae, nervosae, 4-5 mm. longae, coriaceae. Flores radii circiter 5, flavi; lamina lata, 3-dentata et 5-nervia; achaenia fertilia, pubescentia. Flores disci flavi, infer-tilis; achaenia glabra. Pappus albus.

Vanrhynsdorp Div.: Top of Vanrhyns Pass, in shallow pans on rocks, 11th October, 1928, *Hutchinson* 781 (type in Kew Herbarium).

to-do until I got them into line for a snapshot. They were a happy and friendly lot, and I shall not readily forget the experience of my first encounter with a crowd of natives.

Something more was to follow, however. After supper we retired to our hard beds, and were soon fast asleep. But in an hour or two I was awakened by the arrival of a donkey wagon, from which the occupants outspanned in front of the hut in true South African fashion, and apparently unaware of our presence. I listened presently to the munching of the fodder by the animals, and at length I crept softly to the open doorway and peeped out on a scene typical of South African life on the road for at least 300 years: a camp fire near the wagon, and two or three Boers squatting and waiting for the "boy" to make their coffee and "scoff", a bright full moon, and a brilliant sky of myriads of stars completing the wonderful picture. Probably some such scene inspired the writer of the popular song: "Roll along, covered wagon, roll along".

I give here a description of the most interesting plants we collected at the escarpment of the Vanrhyns Pass, arranged in systematic order.

Among them was a rare genus of the FUMARIACEAE, *Trigonocarpus curvipes* Schltr. (No. 780), described by Schlechter in 1900;¹ a twiner allied to *Fumaria*, but with asymmetrical fruits, due to being winged only on one side. Another rare species was *Polygala chuytioides* Burchell (No. 791), included by Harvey in *P. myrtifolia* Linn., the latter found in less elevated regions from the Cape to Natal; a shrub 4-5 ft.; with narrowly oblanceolate leaves crowned by shortly stalked pale-crimson flowers.

On rocks in drifted sand I was surprised to again meet a species I had already collected near Vasco da Gama on the Cape Peninsula, namely *Gramanthes centauroides* (Linn.) Druce (No. 764).

Our No. 796, from the margin of the dried-up Muelen's Vlei, at the top of the Pass, proved a puzzle to me when I came to name it in the herbarium. It is a caespitose herb with matted thick roots and numerous short stems with subopposite toothed leaves. The flowers on my specimen, when dissected, showed four small calyx-lobes, four largish valvate petals, four large oblong anthers, and in the middle four small warty knobs which looked like an apocarpous ovary.

In connection with the naming of this plant I may tell the reader something of a professional secret. When an experienced taxonomic botanist has a plant to name which he cannot determine by any key, he runs it to earth by a process of elimination—that is to say, he takes the *Genera Plantarum* of Bentham and Hooker, or the *Pflanzenfamilien* of Engler and Prantl, according to whether he is more familiar with Latin or German respectively, and runs his eye over each family in turn, to see if he can find a description at all applicable to the plant he has in hand. In this case, on a cold December and foggy night, but over a comfortable fire, I took neither of these classical works, but Phillips' *Genera of South African Plants*, as it is written in English. And so good is it that when I came to the family HALORRHAGACEAE I had a feeling that the specimen I wanted to name might belong there. Most botanists scratch their heads when you mention this family to them, and no doubt I did the same, for it is rather unfamiliar to all but those

¹ Schlechter in *Engl. Bot. Jahrb.* 27: 131 (1900).

who have specialized with it. Anyhow, the plant did belong to this family, and is *Laurembergia repens* Berg., my example having only male flowers, which persistently ran down by my own key to CRASSULACEAE. The female flowers, however, having an *inferior* ovary, definitely refer it to its correct family.

Systematic List of Plants Collected in the Vanrhyns Pass

LIGNOSAE (WOODY DICOTYLEDONS)

- THYMELAEACEAE—*Struthiola ovata* Thunb. (No. 789): shrub 3½ ft.; leaves ovate, acute, about 1 cm. long; flowers white.
- PROTEACEAE—*Protea glabra* Thunb. (No. 802): a shrub 4 ft.; leaves oblanceolate, 5–6 cm. long, glaucous-green, glabrous; heads pale yellow, 5–6 cm. diam.; perianth-limb villous.
- POLYGALACEAE—*Polygala cluytioides* Burchell (No. 791) (see p. 151).
- STERCULIACEAE—*Hermannia Presliana* Turcz. (No. 792): shrublet 1–1½ ft.; branchlets shortly stellate-pubescent; leaves obovate, pinnately lobed; flowers white.
- ERICACEAE—*Grisebachia Dregeana* Benth. (No. 763): shrublet with short Lycopod-like branchlets; leaves imbricate, closely adpressed, woolly; flowers in small clusters; calyx densely pectinate-ciliate; corolla dirty white.

HERBACEAE (HERBACEOUS DICOTYLEDONS)

- CRUCIFERAE—*Heliophila amplexicaulis* Linn. (No. 777): annual with amplexicaul lanceolate entire glabrous leaves, with lax racemes of white or rarely mauve flowers; soon fruiting, fruits recurving, long-stalked, compressed, torulose, with about 6–7 seeds. *H. pinnatisecta* E. P. Phillips (No. 776): annual with pinnati-partite thinly pubescent leaves, and few pale-blue flowers; fruits narrowly oblong, not torulose, 2.5 cm. long, 5–6-seeded.
- FUMARIACEAE—*Trigonocarpus curvipes* Schltr. (No. 780) (see p. 151).
- ZYGOPHYLLACEAE—*Zygophyllum leptopetalum* E. Mey. (No. 788): small shrub; leaves bifoliolate, leaflets obliquely obovate; flowers in small cymes; sepals stellate-puberulous outside; petals yellow, with orange V at base.
- HALORRHAGACEAE—*Laurembergia repens* Berg. (*Serpicula repens* L.) (No. 796) (see p. 151).
- LOBELIACEAE—*Cyphia Cardamines* Willd. (No. 797): leaves radical, pinnati-partite; racemes scape-like, few-flowered; flowers mauve-pink; also collected in this region by Salter in 1930, but previously known only from the Cape Division.
- COMPOSITAE—*Aster filifolius* Vent. (No. 782) (see p. 106). *Helichrysum odoratissimum* Less. (No. 760): annual; leaves linear-oblanceolate, woolly; flower-heads in small dense clusters, yellow, the outer bracts tinged with crimson. *H. scabrum* Less. (No. 801): much-branched shrublet, with woolly branchlets and small narrow sinuate leaves; heads clustered, small, brown-bronze. *Relbania squarrosa* L'Herit. (No. 762): leaves oblong-elliptic, recurved, with sharp points; heads few in a cluster at the ends of the shoots. *Leysera gnaphaloides* Linn. (No. 774): low spreading and woody; leaves acicular, numerous, woolly when young, at length sparingly glandular-setose; heads on slender peduncles, yellow. *Cotula tenella* E. Mey. (No. 782a): leaves nearly all basal, pinnately partite, pilose; heads on slender nude peduncles. *Senecio speciosus* Willd. (No. 783): leaves basal, lyrate, setulose; heads few in a corymb; rays yellow; bracts setulose. *S. asperulus* DC. (No. 759): perennial; leaf-bases much burnt; leaves linear, entire, puberulous; heads yellow, few, corymbose; bracts glandular-setulose. *S. laxis* DC. (No. 784): annual; stem-leaves auriculate at the base, lanceolate; heads small, numerous, paniculate; bracts few, with acuminate black

- tips, glabrous; rays yellow. **S. Burchellii** DC. (No. 758): annual; leaves linear, obscurely toothed; heads few, corymbose; bracts glabrous; rays yellow. **Othonna Pillansii** Hutch. (No. 781) (see above). **Osteospermum bidens** Thunb. (No. 786): stems woolly, angled, angles denticulate; leaves linear, with 2-4 side teeth or small lobes; heads small, yellow. **O. rigidum** Ait. (No. 785): leaves coarsely jagged toothed or lobulate, scabrid; heads yellow. **Dimorphotheca nudicaulis** Harr. (No. 773): leaves linear-lanceolate, obtuse; rays pale salmon, very beautiful. **D. graminifolia** (L.) DC. (Nos. 761, 778): leaves narrowly linear, laxly crisped-pubescent; rays ivory-white, reddish-brown below. **Ursinia cakilifolia** DC. (No. 793): a much-branched herb spreading from the base; ray-flowers bright yellow.
- CRASSULACEAE—**Gramanthes centauroides** (Linn.) Druce (Nos. 764, 766) (see p. 151). **Crassula Dodii** Schoenl. & Bak. f. (No. 770): tiny plant, the stem and leaves red in the sun, greener in the shade; branches pubescent; carpels red. **C. Comptonii** Hutch. & Pillans (No. 765) (see p. 149).
- SCROPHULARIACEAE—**Limosella capensis** Thunb. (No. 800): very small plant, growing in clumps; leaves long-petiolate, spatulate; flowers small, mauve. **Nemesia Cheiranthus** E. Mey. ex Benth. (No. 771): slender annual, with very few and distant ovate-lanceolate leaves; upper lobe of corolla mauve, lower orange; one spur. **Diascia longecornis** (Thunb.) Druce (No. 769): spreading from the base, leaves obovate-spatulate, coarsely dentate; flowers with two long spurs, port-wine colour. **Hemimeris montana** Linn. f. (No. 790): very common, forming carpets about 6 in. high; leaves spatulate-obovate, dentate; flowers yellow; corolla with two pouches.
- GERANIACEAE—**Pelargonium ovale** Burm. (No. 794): under rocks at Muelens Vlei; stems long and prickly; leaves cordate, lobulate and crenulate, softly tomentose below; flowers 3-5 in an umbel; petals white, with crimson blotches.

MONOCOTYLEDONS

- LILIACEAE—**Eucomis Pillansii** L. Guthrie (No. 787): leaves obovate-elliptic; flowers green, the inflorescence terminated by a bunch of lanceolate leaf-like bracts. **Ornithogalum rupestre** Linn. (No. 767): very dwarf with short linear leaves; flowers lemon-yellow; would be good for cultivation in shallow pans.
- ORCHIDACEAE—**Schizodium inflexum** Lindl. (No. 798): tuberous; leaves spatulate-lanceolate; stems (like all other members of this genus) with a twist or kink near the base; flowers pale-lavender, 2-3 to each raceme.
- GRAMINEAE—**Secale cereale** Linn. (No. 795): 2½ ft.; only one plant found; spike at first enclosed by a sheath; awns scabrid.

On Thursday, 11th October, we made an early start, and stole away softly from the still-sleeping burghers and natives, and began the descent of the pass towards Vanrhynsdorp into drought-stricken country. In places the Pass is very steep, and great care was necessary in the descent. We lunched at Vanrhynsdorp, and continued our journey to Nieuwerust, where we stayed the night. North of Vanrhynsdorp our road lay through a nearly flat plain, the surface being none too good. On each side of the route the low quartzite hills were rich in *Conophytum*, etc., and we stopped every now and then to gather living specimens for the Kew collection. On the left of us were the Karee Bergen, and to the north, in the far distance, the lofty Khamiesberg, where the late Professor H. H. Pearson collected on his way to Damaraland. Hereabouts the country was very desolate, no farms being visible anywhere.

On Friday, 12th October, we continued our journey northwards, and my notes, made in the swiftly moving car, record that the vegetation

consisted mainly of shrubby and dwarf species of *Mesembryanthemum*, *Euphorbia mauritanica* Linn., *Galenia*, and *Cotyledon Wallichii*. The country was composed of low hills, much like the lower parts of the Scottish Highlands. During the day (12th October) between Vanrhynsdorp and Nieuwerust, specimens of the following were collected: *Salicornia* sp. (CHENOPODIACEAE) (No. 812), a much-branched shrublet with jointed branchlets and small cup-shaped amplexicaul leaves; *Limonium teretifolium* L. Bolus (PLUMBAGINACEAE) (No. 813), a rare species collected previously by Pillans (No. 6345) and Schlechter (1389) at Knechtsvlakte in September 1931; a very woody species with terete leaves and silky flowers in panicles. *Zygophyllum teretifolium* Sehltr. (ZYGOPHYLLACEAE) (No. 814), with fleshy terete leaves and slightly winged fruits.

Between Garies and Khamieskroon we met with many interesting plants,¹ particularly of note being four species of *Pteronia* (COMPOSITAE), *P. divaricata* Less. (No. 817), with elliptic scabrid-papillous leaves and few clustered heads with glabrous bracts; *P. undulata* DC. (No. 819), with small crisped-undulate leaves and yellow flower-heads; *P. leptospermoides* DC. (No. 821), with short linear glabrous leaves and solitary (though numerous) pale mauve flower-heads; and *P. incana* DC. (No. 822), with small woolly ericoid leaves, and solitary sessile pale-yellow flower-heads; *Oftia revoluta* Bocq. (MYOPORACEAE) (No. 820), a shrub 4 ft., with densely imbricate sessile narrow leaves with jagged margins and axillary white flowers; *Selago glutinosa* E. Mey. (SELAGINACEAE) (No. 826), with shortly acicular puberulous leaves and narrow spikes of white sweet-scented flowers; *Pelargonium moniliforme* E. Mey. ex Harv. (GERANIACEAE) (No. 827), a stemless plant with a few radical poorly developed leaves and a peduncle up to over a foot long, with an umbel of pink flowers blotched with crimson; *Salvia dentata* Ait. (LABIATAE) (No. 832), blue flowers with glandular calyx; and *Teedia lucida* Rudolphi (No. 835), another woody Scrophulariaceous plant with mauve flowers which Thunberg thought was a *Solanum*; this species has a wide range from about here right round the coastal districts to Natal, the second species, *T. pubescens*, having a much more restricted distribution, from Worcester to Humansdorp.

Near Bitterfontein² a few more specimens were gathered, and we stopped for the night at Khamieskroon, a place with a delightful name, and with a very good hotel for such an out-of-the-way part of the world.

¹ Also collected: No. 818, *Senecio cinerascens* Ait. (COMPOSITAE); 823, *Chrysocoma peduncularis* DC. (COMPOSITAE); 824, *Euphorbia* sp. (EUPHORBIACEAE); 825, *Helichrysum scabrum* Less. (COMPOSITAE); 828, *Cluytia Thunbergii* Sond. (EUPHORBIACEAE); 829, *Hebenstreitia crassifolia* Choisy (SELAGINACEAE); 830, *Stachys rugosa* Ait. (LABIATAE); 831, *Ehrharta calycina* Sm. var. *versicolor* Stapf (GRAMINEAE); 833, *Hermannia disermifolia* Jacq. (STERCULIACEAE); 834, *Passerina glomerata* Thunb. (THYMELAEACEAE); 836, *Anthospermum tricoctatum* Sond. (RUBIACEAE); 837, *Solanum supinum* Dunal (SOLANACEAE); 838, *Euclea tomentosa* E. Mey. (EBENACEAE).

² Collected at Bitterfontein: No. 803, *Euryops khamiesbergensis* Hutch. (COMPOSITAE); 804, *Hyobanche glabrata* Hiern. (SCROPHULARIACEAE); 805, *Tripteris microcarpa* Harv. (COMPOSITAE); 806 (destroyed); 807, *Dianthus micropetalus* Ser. (CARYOPHYLLACEAE); 808, *Crassula expansa* Ait. (CRASSULACEAE); 809, *Tripteris glabrata* Harv.; 810, *Crassula rosularis* Harv.; 811, *Pelargonium oblongatum* E. Mey. (GERANIACEAE).

Before breakfast on Saturday, the 13th October, I was early astir and botanised around the low, rounded, boulder-strewn kopje in front of the hotel, and found some interesting species. Plants of *Ursinia* (COMPOSITAE) were very beautiful in clumps among the stones: *U. versicolor* (DC.) N.E. Br. (No. 989), a graceful species with beautiful orange ray-flowers with a large purple spot at the base. Near by were attractive little colonies of *Hebenstreitia minutiflora* Rolfe (SELAGINACEAE) (No. 990), and here and there in fissures of the rocks, but quite rare, the beautiful *Gladiolus equitans* Thunb. (IRIDACEAE) (No. 991), with crimson-red flowers. I again collected *Montinia caryophyllacea* Thunb. (ESCALLONIACEAE) (No. 839), whose taxonomic position is discussed on p. 100; *Indigofera spinescens* E. Mey. (PAPILIONACEAE) (No. 839a), a much-branched shrublet with shortly petiolate trifoliate leaves and solitary shortly silky mauve flowers; *Euryops khamiesbergensis* Hutch. (COMPOSITAE) (No. 840), a shrub with crowded acicular leaves and numerous bright-yellow flower-heads. *Othonna retrorsa* DC. (COMPOSITAE) (No. 840a), with rosettes of narrowly oblanceolate denticulate leaves and small flower-heads. *Lebeckia sericea* Thunb. (PAPILIONACEAE) (No. 841), a shrub 3-5 ft., with narrow oblanceolate leaflets and short racemes of cream flowers. *Lotononis digitata* Harv. (PAPILIONACEAE) (No. 842), low, woody and much branched, with five digitate very narrow leaflets and solitary pale-yellow flowers.

Of particular interest to me later was *Erythrophysa alata* (Eck. & Zeyh.) Hutch. (SAPINDACEAE) (No. 842), about which I wrote some notes in the *Kew Bulletin* (1932: 149, with fig.). Among a number of photographs of paintings of plants made for Governor van der Stel on his expedition to Namaqualand in 1685, and submitted to Kew for determination by Professor Waterhouse, of Trinity College, Dublin, was one which from description might be *Fagara alata* Eckl. & Zeyh. The type specimen of this was obtained from Sonder's herbarium in Vienna, and, although a barren shoot, was no doubt the same species as depicted in the drawing. A further examination and search, however, showed the species to be misplaced in the family RUTACEAE, to which the genus *Fagara* belongs, and it was found to be identical with *Erythrophysa undulata* E. Mey., a genus belonging to the SAPINDACEAE. As the name *Fagara alata* is older than *Erythrophysa undulata*, however, it was necessary for me to make a new combination under the latter genus. The plant is found only in Clanwilliam and Little Namaqualand, and is a shrub with pinnate leaves with a broadly winged rhachis and bladder-like fruits.

Other plants gathered here were *Cyanella capensis* Linn. (TECOPHILAEACEAE) (No. 843), a herb with linear setulose-pubescent leaves and slender racemes of pale-blue flowers, the ovary semi-inferior; *Senecio laxus* DC. (COMPOSITAE) (No. 843a), a herb like the common groundsel, with small yellow heads; *Sutera simplex* (Benth.) (SCROPHULARIACEAE) (No. 844), a herb with narrow subentire leaves and dull yellow flowers; and *Viborgia flexuosa* E. Mey. (PAPILIONACEAE) (No. 845a), leaflets 3, with recurved tips and slender racemes; this is a rare species, and only one specimen from Drège is in the Kew Herbarium. Here also I gathered an *Arctotis* (No. 845), which I have failed to identify with any described species. At the risk of adding to the confusion



N. S. Pillans on
top of Sneuwkop,
Khamiesberg, Nama-
qualand.





Othonna euphorbioides Hutch., on Sneuwkop, Khamiesberg, Namaqualand.

Aloe dichotoma Linn. f. (LILIACEAE), the "Koker Boom" of Little Namaqualand (J. Logan standing).

(Photogr. by the Author.



already existing in this genus, I have described it below as *A. crispata*.¹

We then proceeded a few miles farther on, to Bowesdorp, now almost deserted in favour of Khamieskroon, except for a police station. Here we made preparations for climbing the lofty Sneuwkop of the Khamiesberg, the top much resembling the Paarl mountain, with a similar outcrop of rounded granite at the summit (see p. 156). In my ordinary nailed field boots I was not at all happy on such a surface, the granite proving very slippery, and I longed for a pair of crêpe-soled "veldschoen" or the rope-soled shoes of the Canary Islanders, which enable one to climb up fairly steep rocks without slipping.

The climb to the top of Sneuwkop was somewhat arduous in the tremendous heat, but this was lessened by first walking up the gradual slope to the top of the nek. Once on top, we had a glorious view: to the west the flat horizon of blue sea, and to the east a similar horizon, but grey, and composed of Great Bushmanland, apparently as flat as a pancake, and just like another sea in the distance. Between us and Bushmanland was a myriad of unnamed mountain peaks and dry, barren-looking ranges of hills. Towards the very top of the mountain we had to thread our way among huge boulders towering far above us, and with large eerie caverns, in any one of which I fancied a leopard might be hiding ready to pounce on an intruder. So I, personally, gave them a wide berth, though they seemed a matter of unconcern to my more hardened and experienced companions, one of whom, Mr. N. S. Pillans, may be seen in the accompanying photograph sitting on the cairn at the top of the mountain. However, I was delighted to find here several examples of one of my own botanical "children", *Othonna euphorbioides* Hutch. (see photo, p. 157), a remarkable species of COMPOSITAE (near *Senecio*) with the habit of a fleshy spiny *Euphorbia*, and first collected here by Pearson. It grows in the cracks of hard rocks among scarcely any soil. We collected several interesting plants on this mountain, which during a good rainy season deserves much further study. Here are the plants from Sneuwkop arranged in systematic order:—

Plants Collected on Sneuwkop, Khamiesberg

LIGNOSAE (WOODY DICOTYLEDONS)

ROSACEAE—*Cliffortia ruscifolia* Linn. (No. 851): shrub on top of the mountain, with ovate-lanceolate very acute leaves woolly below.

PAPILIONACEAE—*Lessertia microcarpa* E. Mey. (Nos. 868, 872): woody, with prostrate branches and woolly pinnate leaves; flowers few, racemose,

¹ *Arctotis crispata* Hutch. sp. nov., affinis *A. denudatae* Thunb. sed indumento setuloso differt.

Herba erecta, usque ad 30 cm. alta; caules albo-lanati superne pilis brevibus dense setulosi. Folia basi amplexicaulia et auriculata, pinnatipartita, 5–9 cm. longa, 3–5 cm. lata, lobis irregulariter dentatis et lobulatis supra setulosis infra tenuiter albo-lanatis. Pedunculi usque ad 15 cm. longi. Capitula late campanulata. Involucri bracteae 4–5-seriatae, exteriores ovato-triangulares, anguste lanceolato-appendiculatae appendicibus pubescentibus, interiores oblongo-obovatae et latissime appendiculatae, glabrae, 1.5 cm. longae. Flores radii flavi; corollae tubus 4 mm. longus; lamina 1.8 cm. longa, 5 mm. lata, tridentata. Pappi squamae 8, membranaceae, elliptico-obovatae, 4.5 mm. longae. Flores disci abortivi, apice purpurei, pappis setosis.

Little Namaqualand: Khamieskroon, rays yellow, 14th October, 1928, *Hutchinson* 845 (type in Kew Herbarium).



[Photogr. by the Author.]

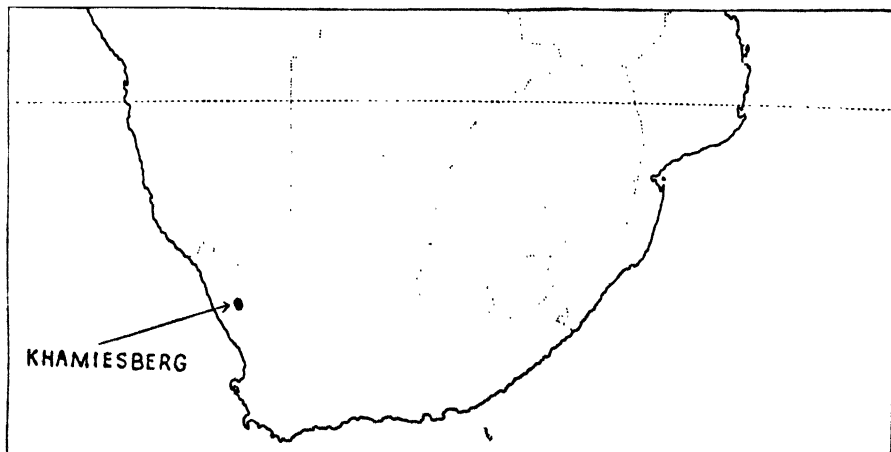
Aloe dichotoma Linn. f. (LILIACEAE), the "Koker Boom" of Namaqualand.

carmine.—Known only from this district, where it was collected at Modder, fonteinberg, 4000 ft., by *Drège*. *Lotononis quinata* Benth. (No. 884): small annual, spreading; flowers yellow; fruits 7 mm. long, finely appressed-pubescent. *Indigofera spinescens* E. Mey. (No. 887): shrub with very small trifoliate leaves minutely pubescent with T-shaped hairs and very short racemes of small purple-carmine flowers.

POLYGALACEAE—*Muraltia rigida* E. Mey. (No. 888): a tangled bush on upper slopes, up to 3 ft.; leaves minute; flowers white; fruits 2-horned at the top.

RUTACEAE—*Diosma vulgaris* Schl. (No. 865): shrub 4–5 ft.; leaves acicular, acute, glandular-punctate; flowers solitary, subsessile, white.

RUBIACEAE—*Galium capense* Thunb. (No. 874): prostrate shrublet, puberulous all over; leaves acicular, in whorls; flowers white, very small, in axillary cymules.



HERBACEAE (HERBACEOUS DICOTYLEDONS)

- CRUCIFERAE **Heliophila seselifolia** Burch. (No. 867): low annual with numerous spreading branches and deeply pinnately divided leaves; flowers few, white on slender pedicels; fruits 3-5-seeded.
- COMPOSITAE--**Aster tenellus** Nees (No. 899): annual much branched from the base; leaves linear, setulose-pubescent; flower-heads on longish peduncles, rays mauve. **Gnaphalium candidissimum** Lam. (No. 880): tiny herb, woolly all over. **Relhania sedifolia** Harr. (No. 864): shrublet 2½ ft.; leaves ericoid, viscid and densely glandular-punctate; heads terminal, subsessile, yellow. **Eriocephalus umbellulatus** DC. (No. 852): shrub 2½ ft.;



Perdicium leiocarpum DC. (COMPOSITAE), from near the top of the Khamiesberg.

leaves small, linear-spathulate, glandular-punctate; flower-heads white, umbellate; achenes villous. **Cotula laxa** DC. (No. 877): tiny herb with pinnatipartite leaves, filiform peduncles and small discoid heads of white flowers. **Euryops multifidus** DC. (No. 885): shrublet; leaves shortly lobed, with sharp hardened tips; achenes woolly. **Cineraria canescens** Wendl. (No. 859): leaves reniform, multilobulate, white-woolly on both sides; flower-heads numerous, rays yellow. **Senecio erosus** L. f. (No. 854): base covered by woolly persistent leaf-bases; leaves all radical, lyrate, pubescent; peduncles about 8 cm. long; rays yellow. **S. cinerascens** Sol. (No. 883): with deeply cut canescent leaves. **Othonna macrophylla** DC.



An old plant of *Welwitschia bainesii* (Hk. f.) Carr. (WELWITSCHIACEAE), near Arandis, Namaqualand.

[Photogr. : I. B. Fole Evans.]



Welwitschia desert near Arandis, Namaqualand.

[Photogr. : I. B. Pole Evans.



Aerva desertorum Engl. (AMARANTACEAE) in the Namib, near Rossing.

(Photogr. : I. B. Pole Erons.



The "Naras", *Acanthosicyos horrida* Welw. (CURCUBITACEAE) in the Namib near Walfish Bay, South West Africa.

[Photogr. I. B. Pole Evans.



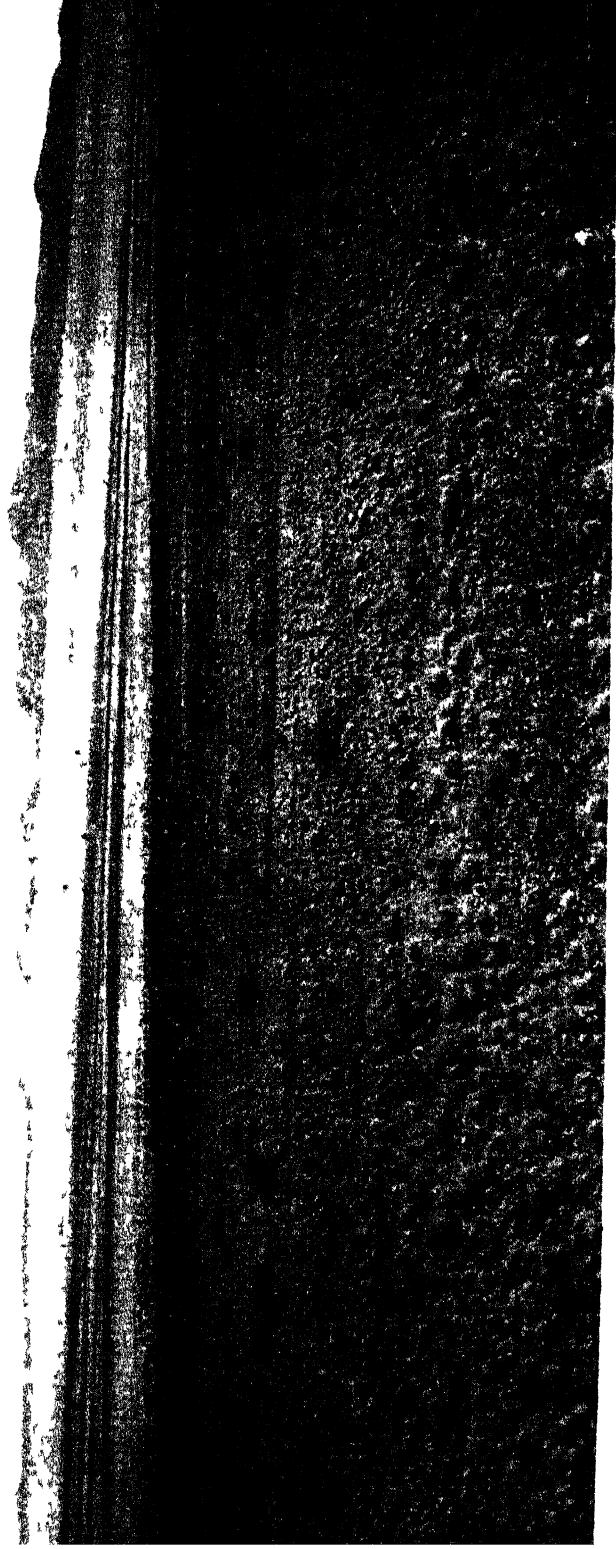
Thorn veld near Windhoek, South West Africa.

[*Photogr. : I. B. Pale Evans.*



[Photogr. : I. B. Pole Evans.

Moringa ovalifolia Dinter & Berger (MORINGACEAE), near Karibib, South West Africa.



Arid plain near Aus, South West Africa

[Photogr I B Pole Frians



The "Anaboom", *Acacia albida* Del. (MIMOSACEAE), near Usakos, South West Africa.

[Photogr.: I. B. Fole Evans.

(No. 886): leaves sharply dentate, oblanceolate; heads few, corymbose, rays yellow. **Osteospermum moniliferum** L. (No. 876): shrub; leaves oblanceolate, acute, leathery, entire to slightly denticulate, woolly when young; ray-flowers yellow. **Dimorphotheca nudicaulis** DC. (Nos. 861, 863): leaves radical, linear-oblanceolate, slightly undulately toothed, setulose-pubescent; heads solitary; rays cream above, red-brown below. **Dimorphotheca aurantiaca** DC. (No. 847): stems leafy; leaves broadly linear to spatulate, entire, obtuse; heads large; rays deep orange, with no "eye"; achenes broadly winged. **Perdicium leiocarpum** DC. (No. 856): near the top of the mountain and very rare; roots numerous, stout; withered leaf-bases persistent; leaves lyrate-lobulate, lobules sharply denticulate, woolly below; heads solitary, ray-less; achenes glabrous. **Ursinia albicaulis** DC. (No. 855): woody and erect, rays yellow. **U. anthemoides** Poir. (No. 870): annual, rays orange, purple below.

LOBELIACEAE **Cyphia digitata** Willd. (No. 860): twining herb with small deeply divided leaves and numerous shortly stalked mauve flowers.

SCROPHULARIACEAE **Nemesia saccata** Benth. (Nos. 848, 869): herb with linear leaves subauriculate at the base, small cymes of dark-blue rather long-spurred flowers. **Sutera foetida** Roth (No. 849): annual 1 ft. high; leaves obovate, crenate, petiolate; flowers mauve, with cream "eye". **Phyllopodium heterophyllum** Benth. (No. 862): tiny annual; leaves narrowly oblanceolate; flowers white in ovoid heads.

SELAGINACEAE **Hebenstreitia fruticosa** Sims (No. 873): herb with elongated stiff leafy branches; leaves shortly pinnatisect, recurved, glabrous; flowers cream with a red spot, in loose bracteate spikes. **Walafrida** sp. (No. 863): tiny annual herb; leaves linear-oblanceolate; flowers white, in short head-like spikes. **Selago albida** Choisy (No. 846): shrublet up to 2½ ft.; leaves ericoid, in fascicles, puberulous; flowers pale mauve to white in short spikes.

OXALIDACEAE **Oxalis comosa** E. Mey. (No. 875): tall slender herb among bushes; leaves and flowers in clusters, the latter pink.

BORAGINACEAE **Lithospermum hirsutum** E. Mey. ex DC. (Nos. 881, 853): branched herb; leaves narrowly oblanceolate, obtuse, pubescent; flowers white, few together. **Lobostemon** sp. (No. 857): leaves mostly radical, linear-oblanceolate, sinuate-dentate, sparingly setose, with bulbous-based hairs; stem leaves much smaller; flowers sky-blue, in a panicle of short cymes. **Lobostemon** sp. (No. 850): shrub up to 4 ft.; leaves broadly linear, setulose; flowers rather large, light blue. **Lobostemon Pearsonii** Leggins (No. 858): shrublet; leaves like the last, but flowers smaller.

MONOCOTYLEDONS

HYPOXIDACEAE — **Hypoxis Scullyi** Baker (No. 879): leaves broadly linear; flowers often 3 together, on slender pedicels, yellow. **Hypoxis serrata** L. f. (No. 866): leaves narrowly linear; flowers solitary, small, yellow.

IRIDACEAE — **Babiana Dregei** Baker (No. 882): leaves very sharp pointed; lanceolate, about 5-nerved; flowers mauve in a dense panicle.

Beyond Bowesdorp the country gradually changes, becoming dryer and dryer as we proceeded northwards, merging at last into semi-desert.

I am indebted to Dr. I. B. Pole Evans for three excellent photographs of this region, one of them showing the interesting Portulacaceous genus *Ceraria*, discovered and described by Professor Pearson and Miss Stephens on their expedition to Namaqualand just before the first Great War in Europe (1914).

We stayed two nights at O'okiep, not actually botanising there, for the country was very dried up, but we made an excursion to Klipfontein, on the Port Nolloth railway, where we collected at Steinkopf, a low, rocky kopje with a very rich and interesting flora.

On the way,¹ about 10 miles from O'okiep, we were fortunate to collect, on the top of a quartzite hill, specimens (No. 914) of an interesting member of the PLUMBAGINACEAE, *Dyerophyton africanum* (Lam.) O. Kuntze, included in the *Flora Capensis* as *Vogelia africana* Lam. Kuntze² changed the name, however, as *Vogelia* Lam. is a later homonym, there being an earlier application of the name by Gmelin (1791) for a genus now included in *Burmannia*. There is also a *Vogelia* Medik (1792), sometimes regarded as a synonym of *Neslia* (CRUCIFERAE), but this name is still used by some botanists on the continent of Europe.

Dyerophyton has a very interesting distribution (see map). There are three species: *D. indicum* (Gibs. ex Wight) O. Kuntze, in Western



[Photogr. : I. B. Pole Evans, Oct. 1928.]

Shrubs of *Ceraria fruticulosa* Pears. & Stephens (PORTULACACEAE), in Little Namaqualand.

India and South-east Arabia, *D. pendulum* (Balf. f.) O. Kuntze in the island of Socotra, and *D. africanum* in Southern Angola (Mossamedes), and through Namaqualand to Prieska. *Dyerophyton* is a very natural genus, differing from *Plumbago* in its eglandular calyx, and from *Ceratostigma* by its free stamens and spicate inflorescence.

This distribution is closely paralleled by a genus of the LOASACEAE, *Kissenia*,³ of which there are two species: *K. capensis* R. Br. ex Harv., in South-West Africa (Hereroland to the Orange River), and *K. spathulata* R. Br. ex T. Anders., in Southern Arabia and Somaliland. The distribution of *Kissenia* is of further interest because it is the only African representative of the family, which is otherwise confined to America.

¹ Also collected: No. 915, *Sutera fruticosa* Hiern. (SCROPHULARIACEAE), and at Ketting, 992, *Tripteris spinescens* Haw. (COMPOSITAE); 993, *Pteronia pallens* Linn. f. (COMPOSITAE).

² *Dyerophyton* O. Kuntze, *Rev. Gen.* 394 (1891).

³ See Dandy in *Kew Bull.* 1926: 174.



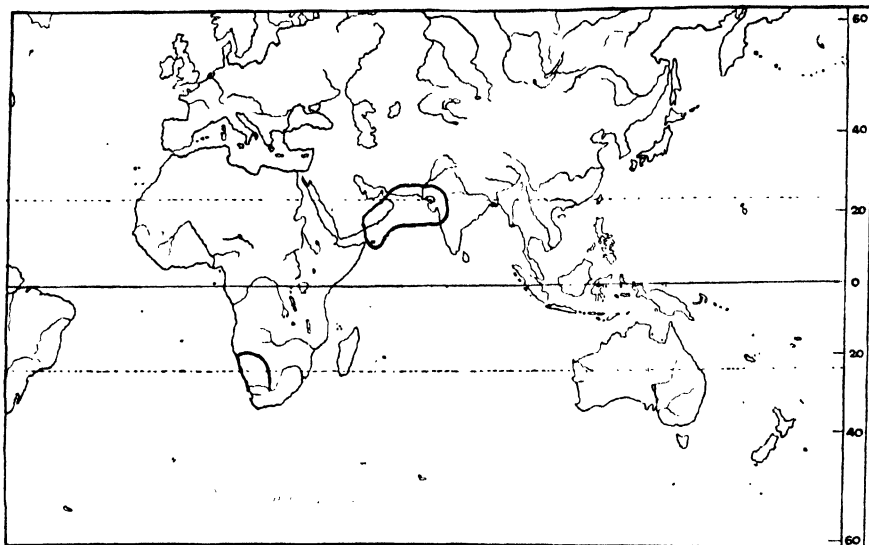
[Photogr. : I. B. Pole Evans, Oct. 1928.]

Part of Namaqualand between Springbok and O'okiep. *Aloe khamiesbergensis* Pillans (LILIACEAE) in the foreground; *Galenia africana* Linn., "Kraalbos", and *Euphorbia mauritanica* Linn. (EUPHORBIACEAE) in the plains beyond.



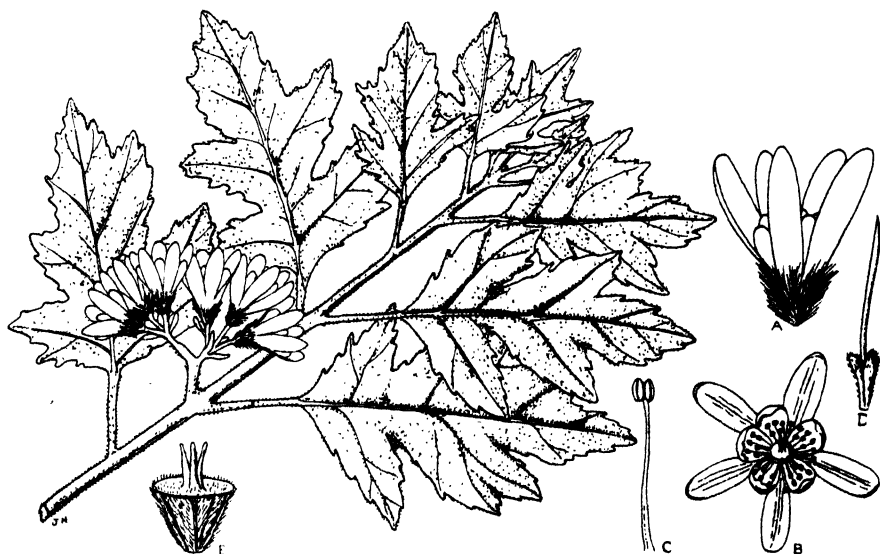
[Photogr. : I. B. Pole Evans, Oct. 1928.]

Side of kopje between Springbok and O'okiep, with *Aloe khamiesbergensis* Pillans (LILIACEAE).



Range of *Dyerophyton* (PLUMBAGINACEAE), very similar to that of *Kissenia* (LOASACEAE) (see p. 165).

The map on p. 165 shows the range of the family. A remarkable feature of *Kissenia* is that the only two known species, though widely separated geographically, are with difficulty recognised the one from the other, and some botanists have regarded them as being the same. There is a difference in the leaves, however, those of the north-eastern plant being less divided and cordate at the base, and the

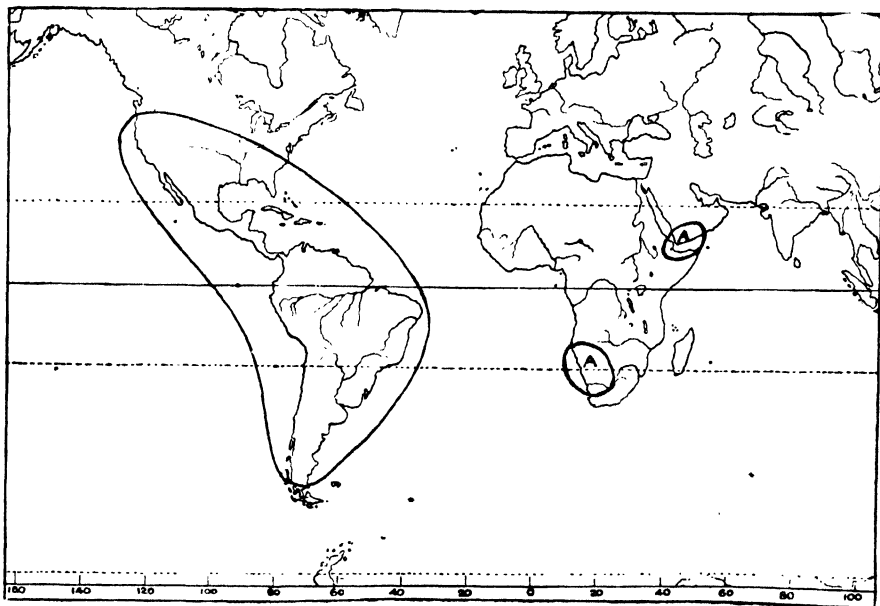


Kissenia capensis R. Br. ex Harv. (LOASACEAE), a species of great phytogeographical interest.

scales have differently shaped tips. The five scales in the flowers of *Kissenia* are found within the petals, and each is the morphological equivalent of three staminodes, united and modified to form a concave, petal-like structure terminating in a reflexed ligule.

A plant which occurs only in Little Namaqualand was also found here, *Colpias mollis* E. Mey. (No. 916) (SCROPHULARIACEAE), a "woody" herb pilose all over, with long-petiolate orbicular coarsely toothed leaves and rather handsome solitary cream-yellow flowers on long stalks.

Hereabouts we also gathered *Codon Royenii* Linn. (No. 917), a remarkable plant, and one of the very few HYDROPHYLLACEAE known from Africa. The family is distributed all over the world except in



Range of the family LOASACEAE; all in America except A, *Kissenia*, the only genus in Africa, with two very nearly related species widely separated geographically (after Dandy).

Europe and Australia, in Africa there being only two genera, in Tropical Africa a few species of *Hydrolea*, and *Codon* in South-west Africa, with a distribution almost the same as that of *Dyerophyton africanum* O. Kuntze—i.e., from Namaqualand eastwards as far as Prieska. *Codon* (see fig., p. 166) differs from the remainder of the family in having a polymorous (6–12-parted) corolla, and is an isolated type. There is probably only one, and not two,¹ species in South-west Africa.

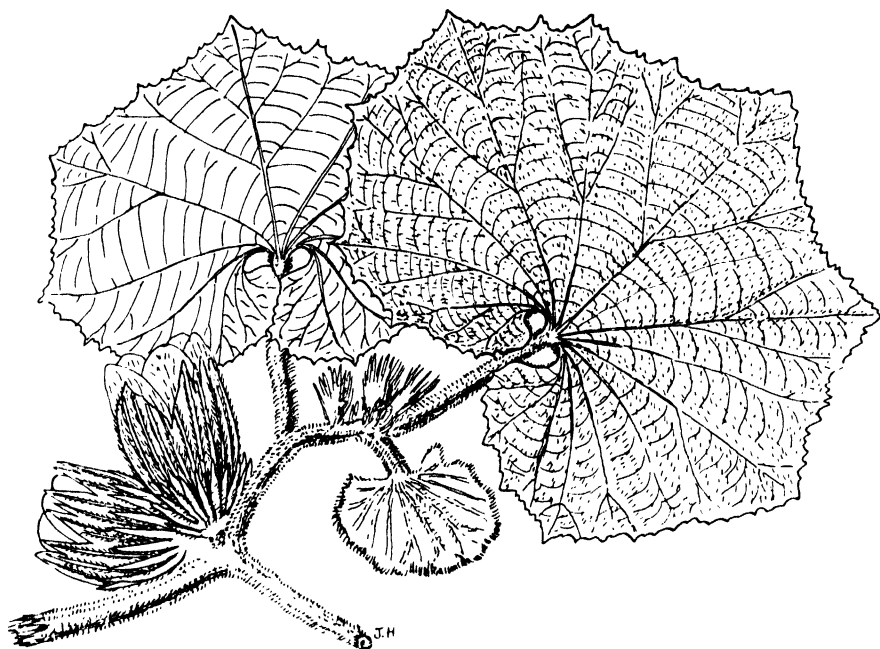
In a drift approaching Steinkopf occurred a striking species of *Hibiscus*, *H. urens* Linn., with large thick kidney-shaped densely stellate-tomentose leaves, and villous clusters of flowers with a crimson corolla girt by a large calyx and multifid epicalyx.

At the foot of Steinkopf were thousands of plants of *Venidium fastuosum* (V. Wylei), in the full glory of its beauty, a wonderful sight

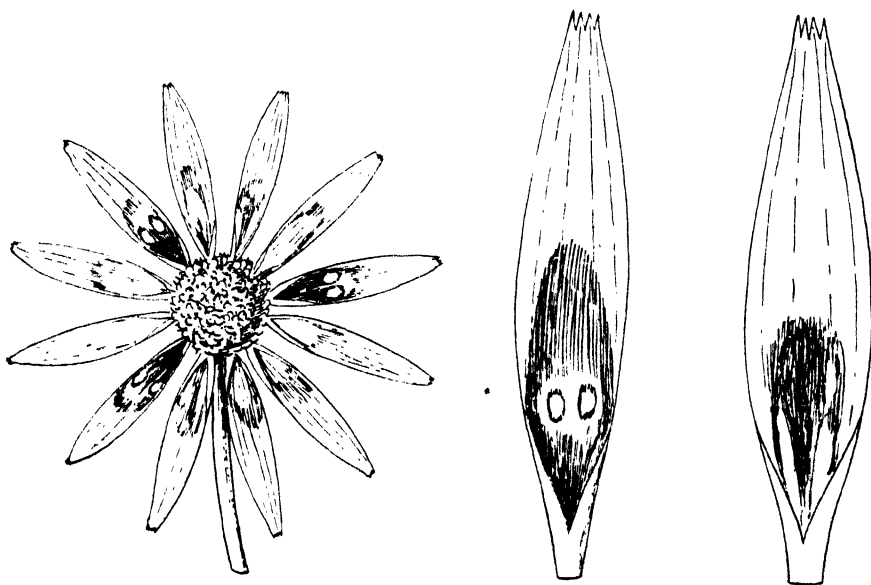
¹ A supposed second species is *Codon Schenckii* Schinz, but I doubt if it is distinguishable.



Codon Royenii Linn.; an isolated genus of HYDROPHYLLACEAE, a family rare in Africa.



Hibiscus urans Linn. (MALVACEAE), a striking species from Namaqualand; flowers crimson.



Diagrammatic representation of head of *Gorteria diffusa* Thunb. (COMPOSITAE), showing some of the ray-flowers with beetle-like spots (see p. 168).

to anyone who has tried to grow it in pots in Britain. Here I observed a curious feature about *Gorteria*, another Composite genus growing among the *Venidium*, which may be of considerable biological importance, and I also encountered my first "snake". But first as to the *Gorteria*, *G. diffusa* Thunb.; I had observed that the flower-heads of *Arctotis* in South Africa were very much eaten by beetles, which dig themselves head first among the flowers, and do considerable damage to them. Usually two or three beetles were observed on each head of various species of *Arctotis*, and they often looked like black spots at the base of the ray-flowers. In the case of *Gorteria*, however, I never observed any beetles, but they mimicked the *Arctotis* in having two or three of the otherwise pure yellow ray-flowers marked with a large black velvet-like blotch at the base, with two white spots like a pair of eyes near the top of the blotch. Those blotches so much resembled the back of the burrowing beetle that they were easily mistaken for them, and the possibility occurred to me that they may act as a protection to the flower-head against beetles by "pretending" to be infested with them already, the camouflage being carried out by the large spots, only present, it should be noted, on *some* of the ray-flowers. The accompanying sketch may show the feature more clearly. As the *Gorteria* flowers were never found to be eaten, it seems reasonable to suppose that protection was afforded by the presence of the beetle-like spots.

My First "Snake"

I may now tell the story of my first "snake", a snake story which the *Cape Argus* newspaper stated no one had ever heard before. Here it is as it occurs in my diary:—

It was a blazing hot day. After making a large collection of plants on this very interesting kopje, I left my companions to continue their exploration in order to find a shady place to put the specimens into the press, which had to be carried about in a climate where the flowers wither as soon as picked. I selected a spot under the shade of a large overhanging rock, with a dark cavernous base. I should mention that before leaving home, and after arriving in South Africa, I had been adjured by many people to "look out for snakes", and I naturally now thought of them in connection with this sinister-looking cave. The same injunction had been repeated several times on our journey to Namaqualand, but familiarity breeding contempt, I had been getting rather careless of the danger.

We had collected a great number of COMPOSITAE, and I had brought an armful of *Venidium fastuosum* (V. Wylei) and *Gorteria diffusa*, etc., to the mouth of the cave in order to get a little shelter from the blazing sun. Remembering the warning about snakes, I looked carefully into the dark corners of the cave, but seeing no signs of any of the reptiles, I proceeded with the work of pressing my plants, whilst my companions rambled farther afield. For this purpose I stooped over the plant-press in order to undo the straps, when I was startled by the sound of a loud *hiss-s-s*, apparently quite near my elbow. I dropped the straps of the press and jumped for my life—a record jump, I think—for I had not come all the way from Kew to be laid low by a snake. After a time, when my beating heart had returned to normal,

I ventured back with considerable caution and prodded about with a long stick among the stones and dark corners. Master snake refused to budge, however. Somewhat reassured, and half believing the noise to be due to my own imagination, I commenced operations a second time. Again I stooped over the press, and again came the vicious *hiss-s-s*, this time apparently quite close to my ear. I jumped clear once more, and no doubt with further practice my previous record went by the board, though I did not stop to measure the distance! I now thought it high time for the mystery to be cleared up, and sought the aid of my nearest companion, who was by no means a raw "rooinek", like myself, and who knew quite a lot about snakes. With a long stick we made a thorough search in the cave, but the snake gave no further sign of its presence. In this I was not a little disappointed, for, having raised the alarm, I was now anxious to produce nothing less than a deadly mamba or a yellow cobra, one of which we had seen that very day. We now deemed it safer, however, to move to a fresh place, my companion taking over the task of putting the plants in the press.

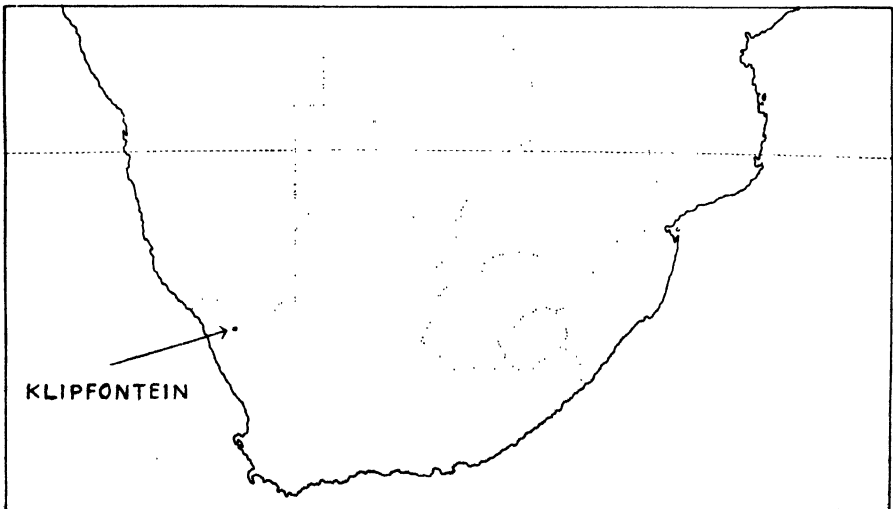
It was not until late that evening that the mystery was solved. During the day I had been wearing a khaki shirt, and on taking it off at night I heard again the now almost familiar *hiss-s-s*. I discovered the "snake" in the breast-pocket of the shirt; alas, neither a mamba nor a cobra, but a harmless packet of dry *Venidium* seeds, which, when I stooped over the press, had slipped up and down the packet with a hissing noise closely resembling that of a snake!

Here is the systematic list of plants collected on Steinkopf, Klipfontein, a veritable flower-garden at the time of our visit. A striking feature was the large number of COMPOSITAE.

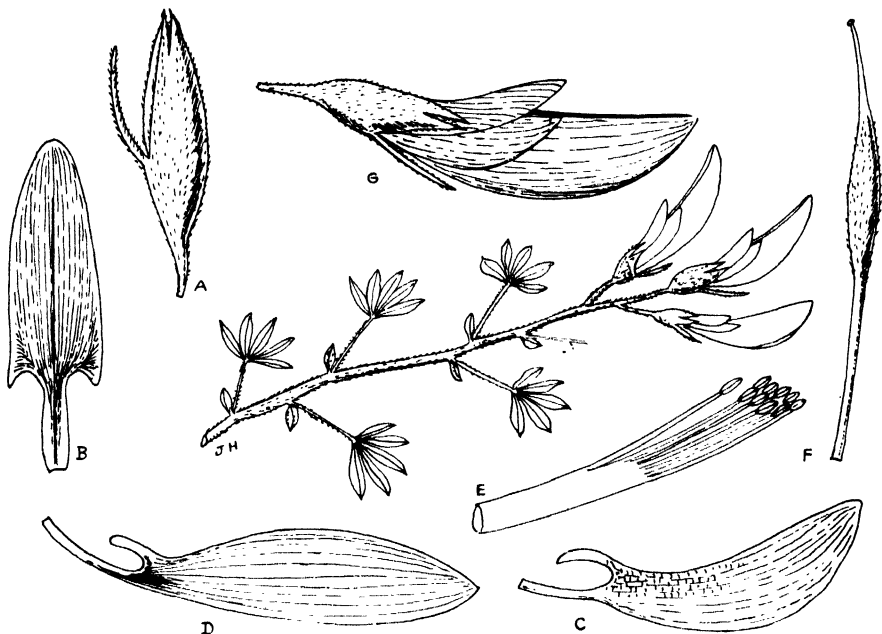
Collected at Steinkopf, near Klipfontein, Namaqualand

LIGNOSAE (WOODY DICOTYLEDONS)

PAPILIONACEAE—*Lebeckia sericea* Thunb. (No. 904): shrub 4-5 ft.; leaflets linear; flowers yellow; pods appressed-silvery pubescent, 6 cm. long.



***Lotononis speciosa* Hutch.¹** (No. 912): a new species allied to ***L. mirabilis* Dinter**, which has a hairy vexillum and smaller calyx; forming a beautiful carpet on rocks; foliage silvery; leaflets 5, narrowly obovate, silky, very small; racemes about 3-flowered; flowers large, rich greenish-yellow, curved, 3 cm. long.



Lotononis speciosa Hutch. (PAPILIONACEAE), a new species from Steinkopf, near Klipfontein, Little Namaqualand.

A, calyx; B, vexillum; C, wing-petal; D, keel-petal; E, stamens; F, pistil; G, flower.

HERBACEAE (HERBACEOUS DICOTYLEDONS)

CAMPANULACEAE—***Wahlenbergia oxyphylla* A.DC.** (No. 896): woody, much branched from the base; leaves lanceolate, very acute, with clusters of smaller leaves in their axils; flowers in cymes, pale blue. ***W. annularis* A.DC.** (No. 891): annual with radical linear-lanceolate leaves; cymes of large pale-blue flowers long-pedunculate.

¹ ***Lotononis speciosa* Hutch.** sp. nov., affinis ***L. mirabilis* Dinter**, sed calyce multo majore, vexillo glabro vel fere glabro differt.

Suffrutex prostratus, densissime ramosus ubique adpresse cinereo-tomentellus; rami pallide flavi. Folia digitate 5-foliolata, numerosissima; petioli 0.5–1 cm. longi, graciles; foliola obovata, apice retusa, circiter 6 mm. longa et 3–4 mm. lata; stipulae ovato-lanceolatae, foliaceae. Inflorescentia breviter pedunculata, pauciflora; bractae subulatae; pedicelli 2.5 mm. longi, adpresse sericei. Calyx circiter 1 cm. longus, postice breviter fissus, lobis utrinsecus subconnatis anguste lanceolatis acutis, lobo antico angustissimo 4–5 mm. longo. Corolla 2.5–3 cm. longa, curvata; vexillum oblongo-hastatum, 2 cm. longum, glabrum vel fere glabrum; alae oblongo-oblancoolatae, inferne appendice reflexo lineare 1.5 cm. longo; carina elliptico-oblancoolata, 2.5–3 cm. longa, glabra. Ovarium longe stipitatum, stipite glabro, adpresse sericeum; stylus 5 mm. longus. Fructus non visus.

Namaqualand: Steinkopf, near Klipfontein, forming a carpet on rocks, flowers rich greenish-yellow, 15th October, 1928, *Hutchinson* 912 (type in Kew Herbarium).

COMPOSITAE—**Pteronia undulata** DC. (No. 895): shrub, 5 ft.; leaves obovate, undulate, papillous-puberulous; flower-heads very shortly stalked in clusters, rich cream-yellow. **Amellus hispidus** DC. (No. 922): leaves linear, lobed or entire, pilose; receptacle bracteate among the flowers; rays white, disk pale yellow. **Aster namaquana** Harv. (No. 924): annual, much branched; rays blue. **Leyssera gnaphaloides** Linn. (No. 921): prostrate, with few long-stalked fairly large heads of bright-yellow flowers. **L. tenella** DC. (No. 909): forming almost a carpet and very pretty, with numerous small heads of pale-yellow flowers on filiform peduncles. **Relbania pumila** Thunb. (No. 919): annual, with stalked glands all over; leaves linear; yellow rays in a contracted involucre. **Helichrysum concinnum** N.E. Br. (No. 911): woolly all over; leaves sessile, undulate, small; involucre small, golden-yellow. **Leontonyx bicolor** DC. (Nos. 893, 920):



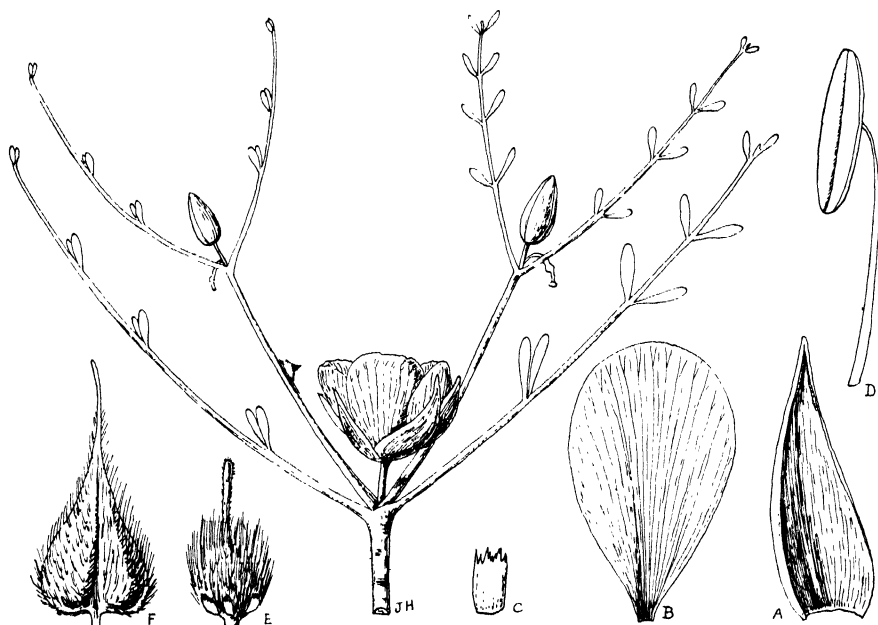
Steinkopf, near Klipfontein, Namaqualand, a kopje rich in flowering plants, especially COMPOSITAE, such as *Venidium*, *Gorteria*, etc.

prostrate and softly woolly; leaves spathulate. **Pentzia suffruticosa** (L.) Hutch. (No. 890): Tansy-like, under rocks, with pinnatisect leaves and corymbs of numerous small yellow flower-heads. **P. grandiflora** (Thunb.) Hutch. (No. 894): similar to and growing with the last but few and larger heads on long peduncles, dominant in cultivated ground. **Cotula tenella** E. Mey. (No. 902): small annual with very numerous small heads. **Senecio laxus** DC. (No. 908): herb like groundsel, with pale-yellow flower-heads. **Tripteris amplexicaulis** Less. (No. 892): herb, 3½ ft.; near rocks; upper leaves lanceolate, auriculate at the base, dentate; flower-heads laxly corymbose, rays rich yellow. **Venidium fastuosum** (Jacq.) Stapf (No. 889): acres of this with deep-orange ray-flowers in two series, the inner series with a dark-brown blotch at the base; outer rays with much smaller blotch. **Arctotis staecheadifolia** Berg. (No. 910): cobwebby all over; leaves lyrate to nearly entire; heads on long nude peduncles, with lemon-yellow rays, no "eye". **Ursinia namaquensis** Bolus (No. 906): an annual with the ray-flowers orange on both sides. **U. versicolor** (DC.) N.E. Br. (No. 907): rays orange on both sides, maroon at the base. **Gorteria diffusa** Thunb. (No.

901): (see notes, p. 168). **Berkheya corymbosa** DC. (No. 898): 4 ft. high; leaves alternate, narrow, very prickly, woolly; heads small, yellow. **B. oppositifolia** Hutch. (No. 897): 3 ft. high; leaves opposite, rounded and very sharply prickly; heads few, yellow. **Didelta spinosum** Ait. (No. 900): leaves opposite, ovate-rounded, cordate at the base; flower-heads yellow, subtended by four leafy bracts.

GERANIACEAE—**Pelargonium quinatum** Sims (No. 913): among granite rocks; pink, two dorsal petals striate; this species confined to Namaqualand.

LABIATAE—**Salvia dentata** Ait. (No. 905): shrub with very small ovate, puberulous leaves and gaping sky-blue flowers.



Sisymbre sparteae, E. Mey. (ZYGOPHYLLACEAE), from near Pella, Bushmanland.
A, sepal; B, petal; C, scale; D, stamen; E, pistil; F, fruit.

MONOCOTYLEDONS

TECOPHILAEACEAE—**Cyanella orchidiformis** Jacq. (No. 903): herb with oblanceolate leaves and panicles of mauve flowers with carmine centre; ovary semi-inferior.

IRIDACEAE—**Lapeyrousia aculeata** Sweet (No. 923): corms with fibrous teeth in whorls; leaf solitary, as long as the inflorescence; flowers in panicles, pink and white; perianth-tube long and very slender.

Across Bushmanland

On the 16th October we set off early from O'okiep to the north-east via Concordia for Pella, across weirdly desolate and very parched country. Whenever plants were observed we stopped to collect them, which was not very often. The wonderful mirages in this part of the country were ample compensation for the tediousness of the journey. Often a beautiful lake would appear on the horizon, only to disappear



[Photogr. : I. B. Pole Evans, Oct. 1928.]

Sisyndite spartea E. Mey. (ZYGOPHYLLACEAE), near Pella, Orange River Valley, Bushmanland.



[Photogr. : I. B. Pole Evans, Oct. 1928.]

Weird plant-forms of *Pachypodium namaquanum* Welw. (APOCYNACEAE), on the Koeris mountains in the Orange River Valley, with a young plant of *Aloe dichotoma* Linn. f. (LILIACEAE) (left horizon).

as we approached its shores. Again a veritable forest of trees would rear itself, sometimes some distance above the skyline, finally to resolve itself into a few stunted bushes or tufts of grass.

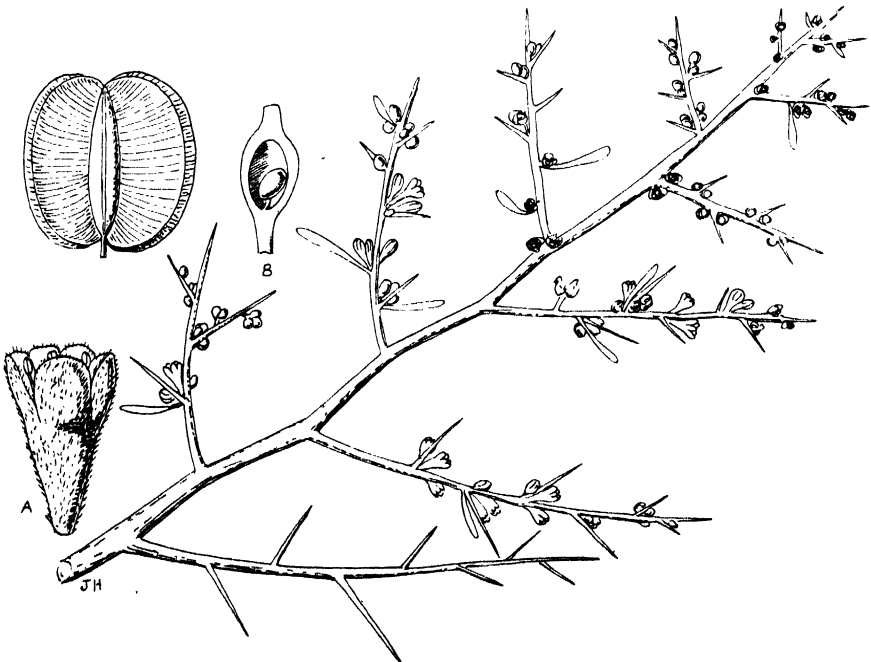
Nevertheless the plants growing under such arid conditions—there



[Photogr. : I. B. Pole Evans, Oct. 1928.]

Euphorbia gregaria Marloth (EUPHORBIACEAE), at Pella, on the Orange River, Bushmanland.

had been no measurable rain in Bushmanland for about four years—are all worthy of consideration, even at the risk of boring the general reader. Plants such as we found growing are of great biological interest, being so remarkably adapted for withstanding drought, and most of



Phaeoptilum spinosum Radlk. (NYCTAGINACEAE), from Kenhart.

A, flower ; B, vertical section of ovary ; C, fruit.



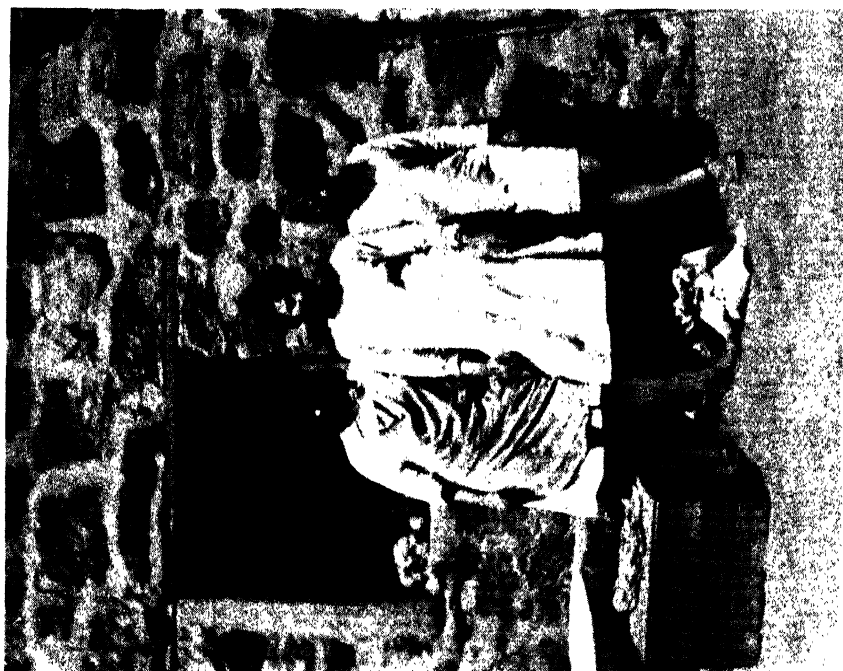
[Photogr. : I. B. Pole Evans, Oct. 1928.]

Aloe dichotoma Linn. f. (LILIACEAE), the "Koker Boom", with nest of Social Weaver bird (*Philtaerus socius*), bush of *Acacia detinens* Burch. (MIMOSACEAE), shrublets of *Eriocephalus umbellatus* DC. (COMPOSITAE), and a grass, *Aristida* sp., in the Kenhardt district.



[Photogr. : I. B. Pole Evans, Oct. 1928.]

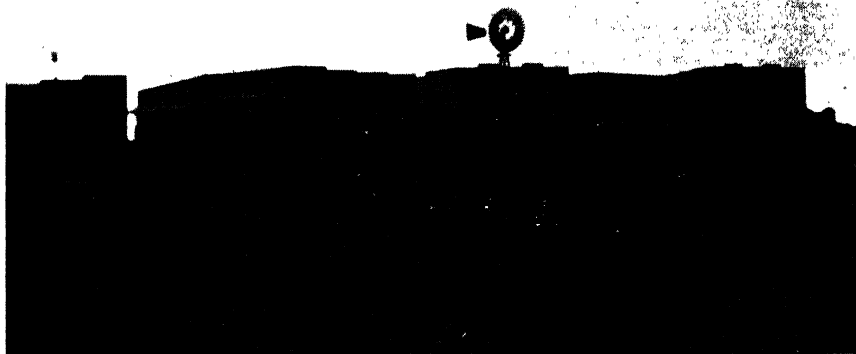
Great Bushmanland between Kenhardt and Poffadder, with patches of "Driedoorn", *Rhigozum trichotomum* Burch. (SCROPHULARIACEAE), in the distance.



A widow farmer and her daughters on the borders of Bushmanland.



Birds' nest.



Poffadder.



Acacia on the border of Bushmanland.

them belong to families which I place at a very high level in the evolutionary scale—i.e., *climax* families, such as COMPOSITAE, ACANTHACEAE, GRAMINEAE, etc.

At a "Poort" between Concordia and Pella we found several stretches of *Salsola Zeyheri* Schinz (CHENOPODIACEAE) (No. 925), a shrublet 1½–2 ft. high, with yellow flowers covered by very woolly bracts. At 41 miles I was deeply interested to see in this drought-stricken country fine stretches of *Augea capensis* Thunb. (ZYGOPHYLLACEAE) (No. 929), a juicy, succulent plant dominant for miles. This is the plant named by Thunberg after Auge, who assisted him on his journeys.

Around Pella, a place at which one never seemed to arrive, a curious Spartium-like shrub, *Sisyndite sparteae* E. Mey., not in flower at the time of our visit, is quite common (see photograph and figure). It also belongs to ZYGOPHYLLACEAE, most members of which are so well adapted to life in dry places. A very similar shrub is *Euphorbia gregaria*, which I did not collect (see photograph). Near Pella we collected a new species of *Ruschia*, *R. muricata* L. Bolus (FICOIDACEAE).

Between Pella and Poffadder grew bushes of *Rhus Burchellii* Sond. (ANACARDIACEAE) (No. 927), our specimens exactly equal to Burchell's type, No. 1722, and a recently described grass, *Schmidtia kaluchariensis* Stent. (No. 928), was quite common over wide areas.

At Poffadder we collected *Gymnosporia lanceolata* (No. 930), found only in the Orange River basin, and a handsome shrub, 20 ft., with long straight spines and cream flowers, something like a narrow-leaved English hawthorn. Growing on the *Gymnosporia* in dry water-courses was *Loranthus oleifolius* Cham. & Schlecht. (No. 931), with flowers dull red with green tips.

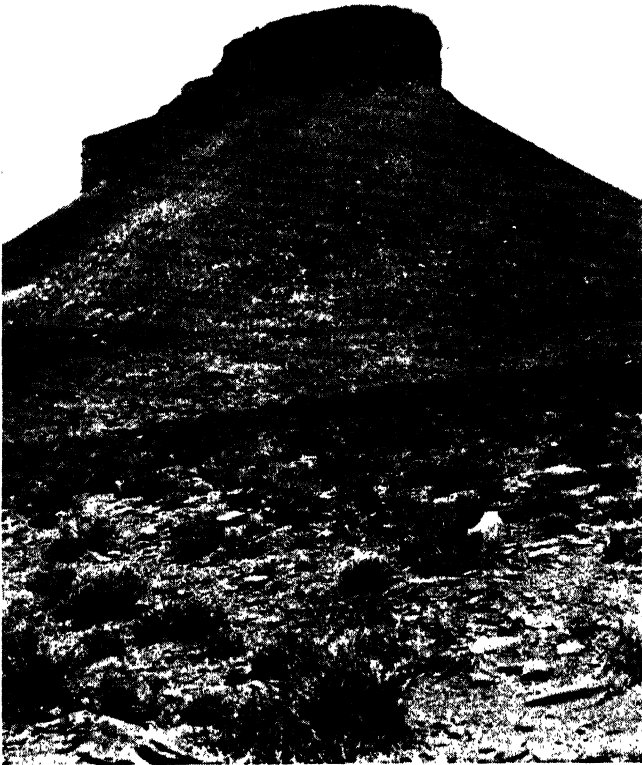
A few miles beyond Poffadder, towards Kakamas, the following plants were thriving and in flower :—

Pelargonium xerophyton Schltr. (GERANIACEAE) (No. 934), a rare tiny gnarled plant with solitary flowers, the petals cream with a crimson blotch; *Acacia Giraffae* Burch. (MIMOSACEAE) (No. 942), tree 20–25 ft., flowers yellow; *Aptosimum Steingroeveri* Engl. (SCROPHULARIACEAE) (No. 932), a low shrublet with blue flowers; *Ursinia annua* Less. (COMPOSITAE) (No. 935); *Senecio sisymbriifolius* DC. (COMPOSITAE) (No. 936), a sticky plant with cut leaves and yellow flower-heads; *Gorteria corymbosa* DC. (COMPOSITAE) (No. 937), so far known only from Namaqualand, a small annual with yellow flower-heads surrounded by thread-like long-pilose bracts, each little plant anchored at the base by the parent involucre; *Pentzia globosa* Less. (COMPOSITAE) (No. 938), a shrublet 1 ft. high, flower-heads yellow; *Dimorphotheca pinnata* Harv. (COMPOSITAE) (No. 946), with sticky multifid leaves and curious horned achenes; *Amellus strigosus* Less. (COMPOSITAE) (No. 947), a small spreading annual with blue rays; *Euphorbia gariepina* Boiss. (EUPHORBIACEAE) (No. 939), 1½ ft. high, with reduced leaves; *Hermannia minutiflora* Engl. (STERCULIACEAE) (No. 940), shrub 2½ ft., densely covered with stellate hairs and small pinkish flowers; *H. stricta* Harv. (No. 926); *Aristida obtusa* Del. (No. 941), a grass forming patches between the Toa grass; *Acanthopsis disperma* Nees (ACANTHACEAE) (No. 945), a tiny plant with spiny bracts and pale-blue flowers, only one or two plants alive, a great quantity apparently dead.

Near Kakamas a striking shrub 4 ft. high was *Chascanum gariepense* E. Mey. (VERBENACEAE) (No. 943), with white tubular flowers; *Forskohlea candida* Willd. var. *virescens* Wedd. (URTICACEAE) (No. 944), with

broad membranous bracts; *Acacia detinens* Burchell (MIMOSACEAE) (No. 948), a common bush up to 12 ft., a well-named plant that hangs on tenaciously to the unwary collector.

South of Kenhardt we passed through some weird scenery, but I have few records, as we were now "homeward bound", with the motoring instinct of speed predominant in the mind of our driver. Within 40 miles distance we stopped to collect the following :—



[Photogr. by the Author.]

A typical kopje near Kakamas.

Amellus strigosus Less. (COMPOSITAE) (No. 949) (see p. 178); *Pentzia albida* Hutch. (COMPOSITAE) (No. 950), a small annual with long peduncles supporting disk-like heads of yellow flowers; *Pentzia incana* O. Ktze. (COMPOSITAE) (No. 968), hoary shrub with small straw-coloured flower-heads; *Nestlera humilis* Less. (COMPOSITAE) (No. 969), a gnarled shrublet with crowded small leaves and sessile heads, much eaten by stock (or game?); *Hermannia erodioides* (Burch.) O. Ktze. (STERCULIACEAE) (No. 951), with deep-red flowers on slender pedicels; *Commiphora gracilifrons* Dinter (BURSERACEAE) (No. 952),



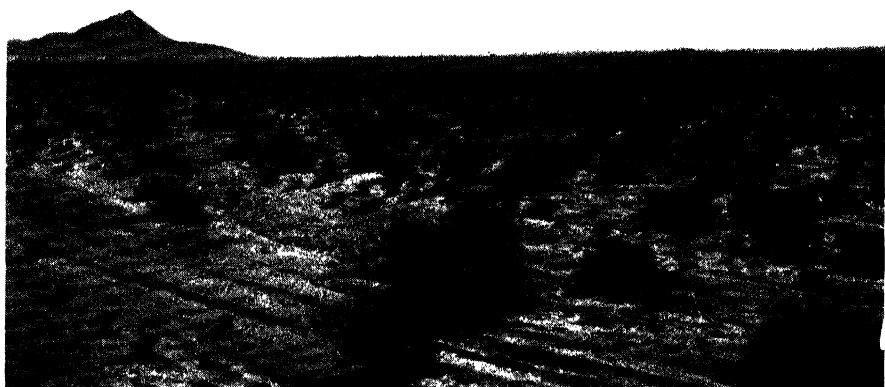
[Photogr. : I. B. Pole Evans, Oct. 1928.]

Little Bushmanland, with *Hoodia Gordonii* Sweet (ASCLEPIADACEAE) on the left.



[Photogr. by the Author.]

Hoodia Gordonii Sweet (ASCLEPIADACEAE), south of Kenhardt.



[Photogr. : I. B. Pole Evans, Oct. 1928.

Part of Little Bushmanland, with bushes of *Sisymbrium sparteum* E. Mey. (ZYGOPHYLLACEAE), and *Galenia africana* Linn. (FICOIDACEAE); the small tufts of grass are *Aristida brevifolia* Steud., the "Toa" grass.

a shrub 5 ft. with linear toothed leaflets; *Phaeoptilum spinosum* Radlk. (NYCTAGINACEAE) (No. 953), a puzzling shrub (see figure, p. 174); *Monsonia umbellata* Harv. (GERANIACEAE) (No. 954), flowers white, an aromatic herb used by the natives as tea; *Tripteris microcarpa* Harv.



[Photogr. : I. B. Pole Evans, Oct. 1928.

The "Toa" grass, *Aristida brevifolia* Steud., in the Kenhardt district.

(COMPOSITAE) (No. 955), flowers yellow, achenes winged; *Monechma hereroense* C.B.Cl. (ACANTHACEAE) (No. 956), a shrub 3 ft., with pale-blue flowers; *Salsola* sp. (No. 957); *Gazania Lichtensteinii* Less. (COMPOSITAE) (No. 958), with yellow rays, green below, and hoary leaves; *Thesium lineatum* L. (SANTALACEAE) (No. 959); *Salsola* sp. (No. 960); *Zygophyllum Dregeanum* Sond. (ZYGOPHYLLACEAE) (No. 961); *Forskohlea candida* Willd. var. *virescens* Wedd. (No. 963).

One plant encountered 36 miles south of Kenhardt and near the Zak River was particularly striking. This was *Hoodia Gordonii* Sweet (ASCLEPIADACEAE) (No. 962), a spiny succulent with sometimes up to thirty-five stems in one clump, and large light-brown flowers (see p. 180).

Between Williston and Merweville we collected quite a number of interesting plants which I shall arrange in systematic order. From the list it will be seen that we were now well within Bolus' "Upper Region" or "Region of Composites":

POLYGALACEAE—*Polygala leptophylla* Burch. (No. 984): a spiny shrub with small leaves and pinkish flowers.

STERCULIACEAE—*Hermannia stricta* Harr. (No. 985): a gnarled shrublet with beautiful red flowers.

COMPOSITAE—*Pteronia adenocarpa* Harr. (No. 974): shrublet with opposite setulose leaves and large heads of yellow flowers. *Aster namaquanus* Harr. (No. 980): with blue rays. *Pegolettia polygalifolia* Less. (No. 971): much-branched shrublet with small spatulate gland-dotted leaves. *Leontonyx spathulatus* Less. (No. 973): dwarf and hoary, with straw-coloured bracts. *Pentzia dichotoma* DC. (No. 983): much-branched from a thick woody base; leaves much divided, pubescent; heads pubescent, small. *Osteospermum moniliferum* L. var. *lanosum* DC. (No. 976): covered with cobweb-like wool. *Euryops multifidus* DC. (No. 979): a shrub with much-divided leaves and small discoid flower-heads. *Arctotis staechadifolia* Berg. (No. 977): in great abundance at one spot; rays white, pinkish-mauve below. *Tripteris spinescens* Harr. (No. 978): with divaricate spiny branchlets, linear entire leaves and broadly winged fruits. *Cuspidia araneosa* (Meerburgh) Gaertn. (No. 987) (the *Didelta cernuum* Less. of *Fl. Capensis*), hoary much-branched annual. *Hirpicium alienatum* (Linn. f.) Druce (No. 972): founded on *Oedera alienata* Linn. f.; there are two species of this genus, this only in Little Namaqualand and Bushmanland south to the Witteberg and to the Uitenhage Karoo, the second (*H. integrifolium* Less.) from the Kamanassie Hills and Caledon.

LABIATAE—*Stachys cuneata* Banks ex Benth. (No. 986): a hoary shrub with small dentate leaves and small axillary flowers.

GRAMINEAE—*Danthonia tenella* Nees (No. 982); small annual with short setose-ciliate leaves and mauve-tinged spikelets.

At 47 miles south of Fraserburg we paused again to gather *Enneapogon scaber* Lehm. (GRAMINEAE) (No. 964), with narrow panicles of mauve-tinged spikelets and awns; *Pteronia leucoclada* Turcz. (COMPOSITAE) (No. 965), with tiny smooth leaves; *Pteronia inflexa* Thunb. (No. 966), collected only by Thunberg and by Burchell (No. 1495) in this Fraserburg Division, with elliptic setulose leaves and cone-like flower-heads; *Hermannia spinosa* E. Mey. (STERCULIACEAE) (No. 967), an intricately branched shrublet with small pale-pink flowers.

Our return to the starting-point at Matjesfontein ended this wonderful trip to Namaqualand and Bushmanland, for which I was indebted to Mr. J. Logan and Mr. Pillans, who made it such a conspicuous success, the former by the generous use of his powerful Studebaker car, the latter in collecting and helping to press the plants.

Chapter X

EXCURSION TO THE COLD BOKKEVELD

A FEW days were now spent in pressing plants gathered on our trip to Namaqualand and packing up succulents for Kew. On 26th October I added a few more to my exsiccata from the slopes of Table Mountain ¹ near the upper road to Cape Town above Rondebosch.

On Saturday, 27th October, I was very pleased to accompany Professor and Mrs. Compton on a camping trip to the Cold Bokkeveld, beyond Ceres. On the way, between Durbanville and Wellington,² a few plants were added to our presses.

At Bains Kloof I gathered specimens of *Pelargonium zonale* Ait. (No. 1006), reminding me of greenhouses at Kew, and a beautiful Papilionaceous shrub, *Hypocalyptus sophoroides* (Berg.) Druce (No. 1007), this now being the name for *Hypocalyptus obcordatus* Thunb. of the *Flora Capensis*, having been founded on *Spartium sophoroides* Berg., the earliest specific name. This lovely plant was once grown in Europe, and was figured very early in the *Botanical Magazine* (t. 1913) and the *Botanical Register* (t. 128). My black-and-white figure gives a botanical representation of it, but can convey little idea of its beauty. It is a shrub or small tree, and occurs in kloofs such as this. I gathered it again on two occasions, in the Waterkloof near Ladismith, and on the Zwartberg Pass. Hereabouts were also trees of *Podocarpus latifolius* R. Br. (TAXACEAE), one of South Africa's few "CONIFERAE".

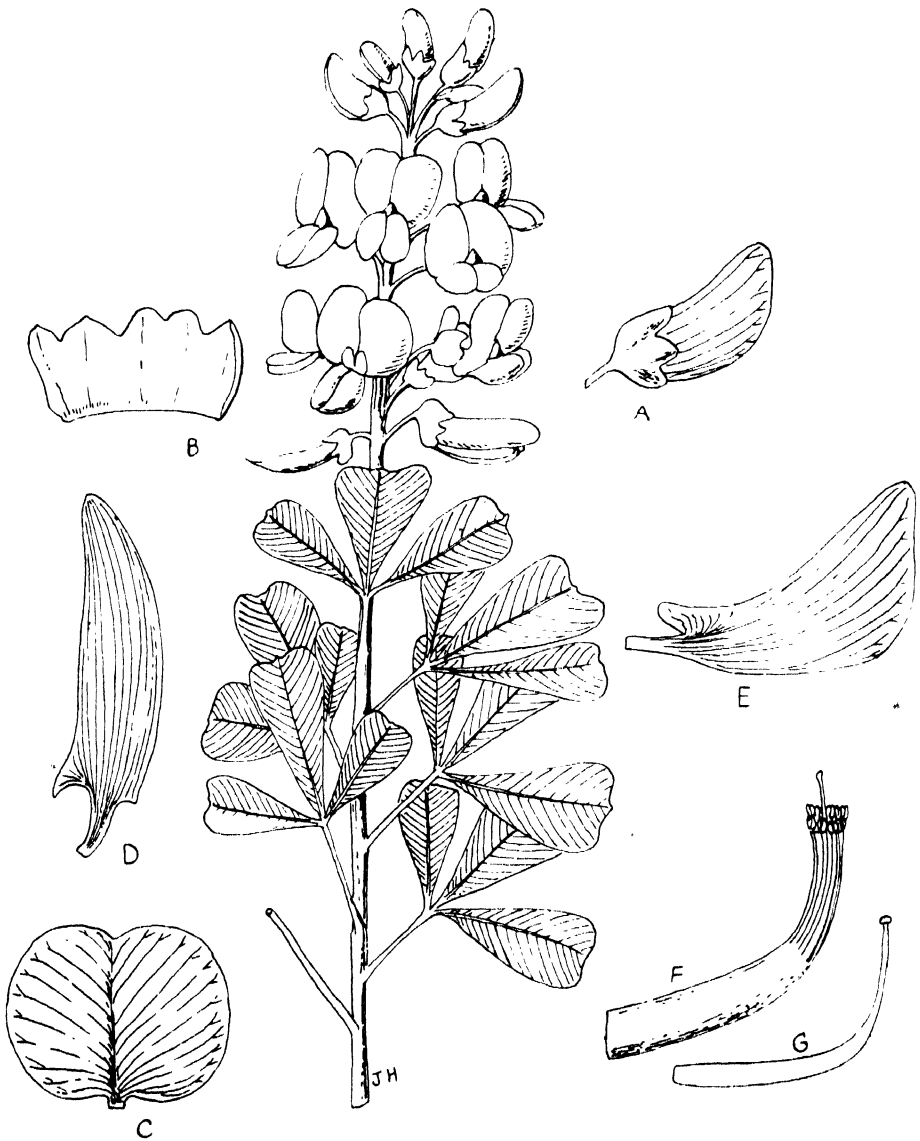
After tea at Ceres we climbed the Gydouw Pass, and I was anxious about the pulling qualities of my little car, whose engine boiled towards the top. There I gathered a white-flowered prostrate ericaceous plant, *Eremia totta* (No. 1009), and a few miles farther on we camped out in the bush by the side of the main road.

During the night the Cold Bokkeveld did not belie its name, and in the morning I was glad of the warmth of a roaring fire before going out to collect in the mountains about 7 miles west of the Gydouw Pass. Here were quite a number of ERICACEAE and SELAGINACEAE in flower.

Among the more interesting plants were *Tittmania laxa* Presl. (No. 1029), a bush 2 ft. high, with small white flowers, which I mistook for RUTACEAE, but which proved to be BRUNIACEAE; two striking orchids: *Bartholina pectinata* R. Br. (No. 1045), with solitary white flowers, large and spidery, on a hairy stalk from a solitary orbicular leaf; it ranges from Tulbagh to the Cape and Caledon; and *Disa maculata*

¹ No. 994, *Helichrysum teretifolium* (Linn.) Less. (COMPOSITAE); 995, *Relhania genistifolia* L'Hérit. (COMPOSITAE); 996, *Borbonia cordata* Linn. (PAPILIONACEAE); 997, *Silene gallica* Linn. (CARYOPHYLLACEAE); 998, *Scabiosa Columbaria* Linn. (DIPSACACEAE).

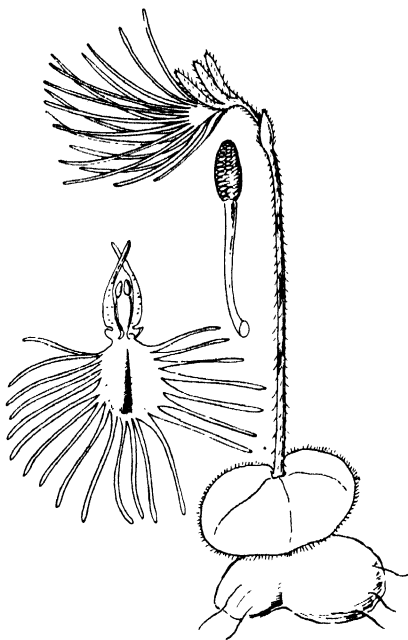
² No. 1000, *Priestleya reflexa* (Thunb.) Druce (PAPILIONACEAE); 1001, *Polycarena capensis* Benth. (SCROPHULARIACEAE); 1002, *Helichrysum stellatum* Less. (COMPOSITAE); 1003, *Gorteria personata* L. (COMPOSITAE); 1004, *Relhania sessiliflora* Thunb. (COMPOSITAE); 1005, *Wahlenbergia costata* A.DC. (CAMPANULACEAE).



Hypocalyptus sophoroides (Berg.) Druce (PAPILIONACEAE).

A, flower bud; B, calyx opened out; C, vexillum; D, wing petal; E, keel petal; F, stamens and style; G, pistil.

Linn. f. (No. 1011), in fissures of rocks, with solitary pale-blue flowers and mottled bracts on the peduncle; its range is similar to that of the preceding species; *Cotula macroglossa* Bolus (COMPOSITAE) (No. 1057), with large white rays, purple below; this proved to be equal to *Bolus* 7329 and *Lervyns* 1935 from this same district. PROTEACEAE were represented by *Leucadendron crassifolium* R. Br. (No. 1062), a shrub 4 ft. high with bright-yellow leafy bracts, and *Protea scabriuscula* Phillips (No. 1063), a very rare species (see p. 188), which, so far as is known, occurs only in this locality. It is closely related to an equally rare species from Tulbagh, *P. Scolopendrium* R. Br. Our plant had a short creeping scaly stem with tufts of oblanceolate leaves and sessile top-shaped heads covered with silky narrow-pointed bracts. This species was first collected by Bodkin (Bolus Herb. 7557) in 1891, and then by Schlechter (No. 10,000) in 1897, probably at this very spot. Another proteaceous plant collected here deserves special mention. This was *Aulax pinifolia* Berg. (No. 1064), a very highly advanced member of the family. In general appearance it resembles many narrow-leaved species of *Leucadendron*, but in *Aulax* the inflorescence of one sex has not advanced quite so far as in *Leucadendron*. Both the male and female flowers of *Leucadendron* are enclosed in bracteate heads, but in *Aulax* the male flowers are in spike-like racemes, the female in involucrate heads, the involucre being made up of whorls of flattened foliate and laterally bracteate branchlets resembling pectinate bracts, and the female flowers are solitary on the inner side of these modified branchlets, and also arranged in spirals on a central axis, or only the latter condition is present. I know of no other heads of flowers formed in this way. In a phylogenetic arrangement of the South African genera of PROTEACEAE, therefore, *Aulax* would take the penultimate position next to *Leucadendron*.



Bartholina pectinata R. Br. (ORCHIDACEAE), from the Cold Bokkeveld; flowers white.

Collected in the Cold Bokkeveld, about 7 miles west of Gydouw Pass, October 1928

LIGNOSAE (WOODY DICOTYLEDONS)

ROSACEAE—*Cliffortia ilicifolia* Linn. (No. 1022): shrub; leaves imbricate, lanceolate, recurved, with prickly margins. *C. atrata* H. Weim. (No. 1020): shrub 4 ft., branches like those of *Larix europaea*, the acicular leaves in fascicles on short shoots.

- PAPILIONACEAE—*Aspalathus heterophylla* *E. Mey.* (No. 1017): shrub 4 ft., with whip-like branches; leaves very small in fascicles, spatulate-obovate, very silky; flowers creamy-yellow, in short oblong spikes with silky bracts. *A. argyrella* *MacOwan* (No. 1054): very low shrublet, with sessile trifoliate villous leaves and small heads of rich creamy-yellow flowers.
- BRUNIACEAE—*Tittmannia laxa* *Presl* (No. 1029) (see p. 183).
- PROTEACEAE—*Serruria elongata* *R. Br.* (No. 1035): prostrate, leaves multipartite with narrow segments; flowers greyish-red, heads solitary or a few together. *Protea scabriuscula* *Phillips* (No. 1063) (see p. 185). *Aulax pinifolia* *Berg.* (No. 1064) (see p. 185). *Leucadendron crassifolium* *R. Br.* (Nos. 1026, 1062): 3½ ft., leaves thick, spatulate-obovate, mucronate, almost nerveless; bracts greenish-yellow tinged with red or bright yellow. *L. decurrens* *R. Br.* (Nos. 1024, 1028): shrub 4–6 ft.; leaves narrowly oblanceolate, faintly nerved; male bracts yellow, female reddish.
- EUPHORBIACEAE—*Cluytia imbricata* *E. Mey.* (No. 1053): shrublet, leaves small and ericoid; flowers small, greenish-yellow. *C. rubricaulis* *Eckl.* (No. 1031): leaves small, broadly elliptic, with rough margins; flowers green. *C. polifolia* *Jacq.* (No. 1027): stems short, leaves shortly linear, much recurved, glaucous; flowers light brown.
- ERICACEAE—*Erica denticulata* *Linn.* (No. 1016): 1½ ft.; leaves short, shining, glabrous; flowers greenish-cream-yellow, with broad denticulate calyxlobes. *E. placentaeflora* *Salisb.* (No. 1018): 9 ins.; leaves acicular, shining; calyx reddish-pink; corolla the same colour but smaller. *E. cristaefflora* *Salisb.* (No. 1021): 3 ft.; leaves short, glabrous; flowers with deep-pink calyx and corolla. *E. peltata* *Andr.* (No. 1044): 9 ins.; leaves very small and adpressed; flowers very small and pink with purple anthers. *E. exurgens* *Andr.* (No. 1012): 3 ft. high; leaves rather long, puberulous; flowers reddish-yellow, very sticky; anthers rather long-exserted. *Grisebachia similis* *N.E. Br.* (No. 1030): 2 ft.; leaves very small and crowded; flowers very small, white, with ciliate calyx.
- CELASTRACEAE—*Gymnosporia lucida* (*L.*) *Loesn.* (No. 1025): shrub; leaves glaucous green, thick, obovate-elliptic; flowers small, fasciculate.
- SANTALACEAE—*Thesium strictum* *Berg.* (No. 1050): flowers clustered together, white.
- RUTACEAE—*Agathosma variabilis* *Sond.* (No. 1037): shrublet 1½ ft.; strong scent; leaves small, lanceolate, laxly ciliate, glandular; flowers mauve in a terminal cluster. *A. commutata* *Sond.* (No. 1051): a much-branched shrublet with balls of white flowers, the sterile filaments petaloid and resembling the petals, long-clawed.

HERBACEAE (HERBACEOUS DICOTYLEDONS)

- CRUCIFERAE—*Heliophila crithmifolia* *Willd.* (No. 1038): leaves in a tuft towards the base, pinnatipartite; flowers mauve-blue; fruit margins undulate. *H. pusilla* *L. f.* (No. 1061): much-branched and dwarf; leaves tripartite; flowers very small, pink; fruit divided into bead-like segments.
- MOLLUGINACEAE—*Adenogramma galioides* *Fenzl* (No. 1052): a very tiny species, about 1 cm. high, with setose-tipped leaves and small white flowers.
- CAMPANULACEAE—*Wahlenbergia Ecklonii* *Buek* (No. 1039): stems short, slender, tufted; leaves narrowly lanceolate, pubescent below; flowers light blue.
- COMPOSITAE—*Aster pusilla* (*N.E. Br.*) *Hutch.* (No. 1041): tiny annual, with spatulate-oblanceolate hirsute leaves, rays blue. *Leontonyx pumilio* *O. Hoffm.* (No. 1059): tiny annual with woolly linear leaves and clustered whitish flower-heads. *Hellechrysium rubellum* *Less.* (No. 1032): dwarf, with slender shortish branches, heads very small, reddish. *Relbania squarrosa* *Linn.* (No. 1036): shrublet 1½ ft.; leaves recurved, with hooked points, viscid; heads few together, sessile, yellow. *Cotula macroglossa* *Bolus* (No. 1057) (see p. 185). *Senecio diffusus* *Thunb.* (No. 1058): annual, leaves oblanceolate, pinnatifid; rays pale yellow. *S. erosus* *Linn. f.* (No. 1043): perennial; leaves radical, narrowly oblanceolate, obscurely toothed, puberulous below; heads scapose, with or without rays. *S. diversifolius* *Harv.* (No. 1042): perennial, leaves radical, pinnatisect, glabrous; peduncles slender; rays yellow. *S. parvifolius* *DC.* (No. 1033): shrublet 1–1½ ft.;

leaves small, deeply cut; heads fairly numerous, corymbose, small; rays yellow. **S. cymbalarifolius** (L.) Less. (No. 1019): rootstock tuberous; leaves lyrate, towards the base of the stem, carmine-purple below; heads showy, solitary on sparingly bracteate peduncle; rays and disk mauve-purple. **Euryops Comptonii** Hutchinson, n. sp.¹ (No. 1046): shrublet 1 ft. high; leaves pinnatifid, small; heads solitary on slender peduncles, rays yellow.

SCROPHULARIACEAE—**Polycarena capillaris** Benth. (No. 1049): small annual; leaves very few, narrowly oblanceolate; flowers cream, few in a terminal cluster on a slender peduncle.

SELAGINACEAE—**Selago lamprocarpa** Schltr. (No. 1034): small shrub; leaves short and ericoid, with thick recurved margins; flowers white, in loose spikes. **S. triquetra** Linn. f. (No. 1047): shrublet 1½ ft.; leaves as above, but margins not recurved; flowers white, in dense short spikes.

GERANIACEAE—**Pelargonium laevigatum** (L. f.) Willd. (No. 1040): woody, 1–1½ ft.; leaves in our specimen unifoliate (usually 3 or more foliolate); leaflet lanceolate, glaucous-pink; flowers small, petals mauve-pink, striped with carmine.

BORAGINACEAE—**Lobostemon laevigatus** Buek (No. 1015): shrub 3 ft.; leaves oblong-lanceolate, with short bulbous-based hairs on the margin; flowers pale blue.

MONOCOTYLEDONS

IRIDACEAE—**Ixia polystachya** Linn. (No. 1048): leaves 2, narrowly linear-oblanceolate; peduncle slender, bearing a few crimson flowers. **Gelssorhiza ornithogaloides** Klatt (No. 1055): short and very slender; leaves 2, almost filiform; flowers solitary, yellow. **G. inconspicua** Baker (No. 1013): stem short, bent, with about 3 small narrowly oblong leaves; flowers solitary or paired, white tinged with deep pink outside. **Watsonia Meriana** Miller (No. 1070): 6 ft., and handsome; flowers curved and scarlet in an elongated spike.

ORCHIDACEAE—**Disa maculata** Linn. f. (No. 1011): 6 in. high; leaves small, basal, oblanceolate, 5-nerved; flowers solitary, pale blue, bracts spotted. **Bartholina pectinata** R. Br. (No. 1045): tuber bearing one rounded ciliate leaf and one white spider-like flower. **Satyrium ochroleucum** Bolus (No. 1010): in fissures on the face of shady rocks; 6–9 in. high; spur 2 cm. long. **Schizodium inflexum** Lindl. (No. 1014): 6–9 in. high; basal leaves narrowly obovate; flowers 2–3, deep pink, lip mottled with carmine.

GRAMINEAE—**Pentastichis colorata** Stapf (No. 1023): densely tufted, 1–1½ ft.; leaves filiform-subterete, glaucous; spikelets in small panicles.

On our return through Bain's Kloof² I was lucky enough to find in full flower a species of a very interesting genus of COMPOSITAE.

¹ **Euryops Comptonii** Hutch., sp. nov., fruticuloso glabro foliis pinnatifiditatis dense imbricatis pedunculis gracilibus distincta.

Fruticulus circiter 20 cm. altus, e basi ramosus; rami purpurascens, glabri. Folia dense imbricata, pinnatifiditatis, circiter 1 cm. longa, segmentis acicularibus acutis glabris. Capitula solitaria, terminalia, longe pedunculata, 1.5 cm. diametro, flava; pedunculi graciles, 6–8 cm. longi, purpurascens, glabri. Involucris bracteae circiter 12, ad medium connatae, 7 mm. longae, lobis anguste triangularibus 2-nervis. Flores radii circiter 12; lamina 7 mm. longa, 6-nervia. Pappus setae paucae, barbellatae. Achaenia glabra.

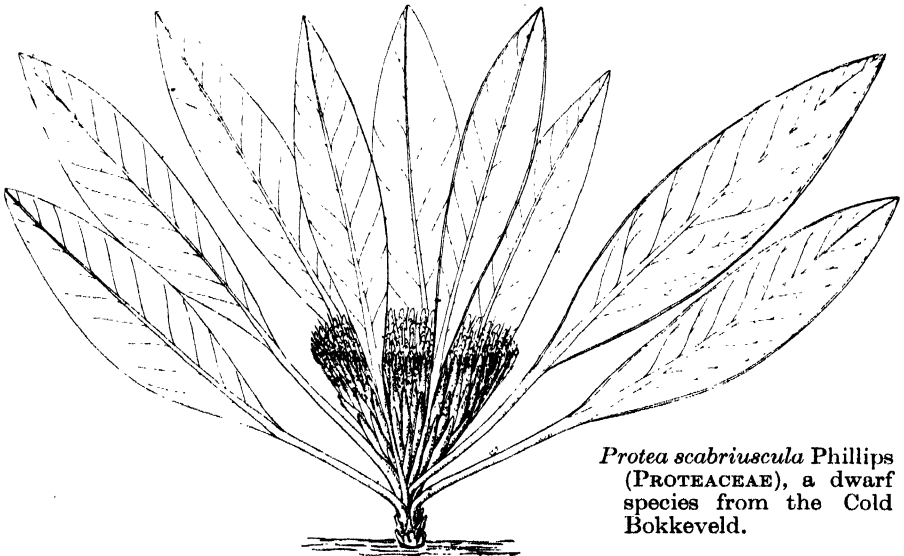
South Africa: Cold Bokkeveld, 7 miles beyond Gydouw Pass, 28th October, 1928, Hutchinson 1046 (type in Kew Herbarium).

² Also collected: No. 1065, *Psoralea aphylla* Linn. (PAPILIONACEAE); 1067, *Aspalathus genistoides* Linn. (PAPILIONACEAE); a fine graceful shrub 12 ft. high with a multitude of yellow flowers and small leaves like that of a larch; 1068, collected at Paarl; 1069, *Lobostemon argenteus* Buek (BORAGINACEAE) (between Bains Kloof and Wellington).



Heterolepis aliena (Linn. f.)
Druce (COMPOSITAE), of
great phylogenetic inter-
est (see p. 189).

A, ray-flower, showing
the extra corolla-lobe (A1)
and abortive anthers (A2);
B, abortive anthers; C,
disk-flower; D, stamens;
E, pappus-setae.



Protea scabriuscula Phillips
(PROTEACEAE), a dwarf
species from the Cold
Bokkeveld.

which is a veritable "missing link". This was *Heterolepis aliena* (Linn. f.) Druce (No. 1066), a member of the tribe INULOIDEAE. Its interest lies in the structure of the ray-flowers. These appear to be of the ordinary ligulate type; but when dissected they show the presence of an extra narrow subulate or almost filiform lobe opposite the ligule, indicating its origin from a normal and actinomorphic 4-lobed corolla such as found in the disk flowers. But in addition to this fourth lobe there is a ring of abortive anthers, showing again that the ray-flower of the COMPOSITAE has been derived from the "discoid" type. The limb of the ray-flowers of *Heterolepis* is therefore bilabiate, the abaxial part being composed of the union of three corolla lobes, the adaxial part of one small reduced lobe. This structure is often found in another tribe, the MUTISIEAE, and *Heterolepis* shows how the latter group may have been evolved, MUTISIEAE being mainly from the Southern Hemisphere. There are three species of *Heterolepis*, which is an endemic genus: *H. aliena*, occurring in kloofs bordering the Karoo from 'Tulbagh to Caledon, *H. peduncularis* DC., from the Bot River to Riversdale, and *H. mitis* DC., only once collected, by Drège, between Zoutpans Nek and Enon, in the Klein Winterhoek (Uitenhage Div.), where it flowers in March. The last species is little known and needs re-collecting, but all three species show the above-mentioned highly interesting characters in an equal degree.

PART II

Chapter XI

CAPE TOWN TO GEORGE

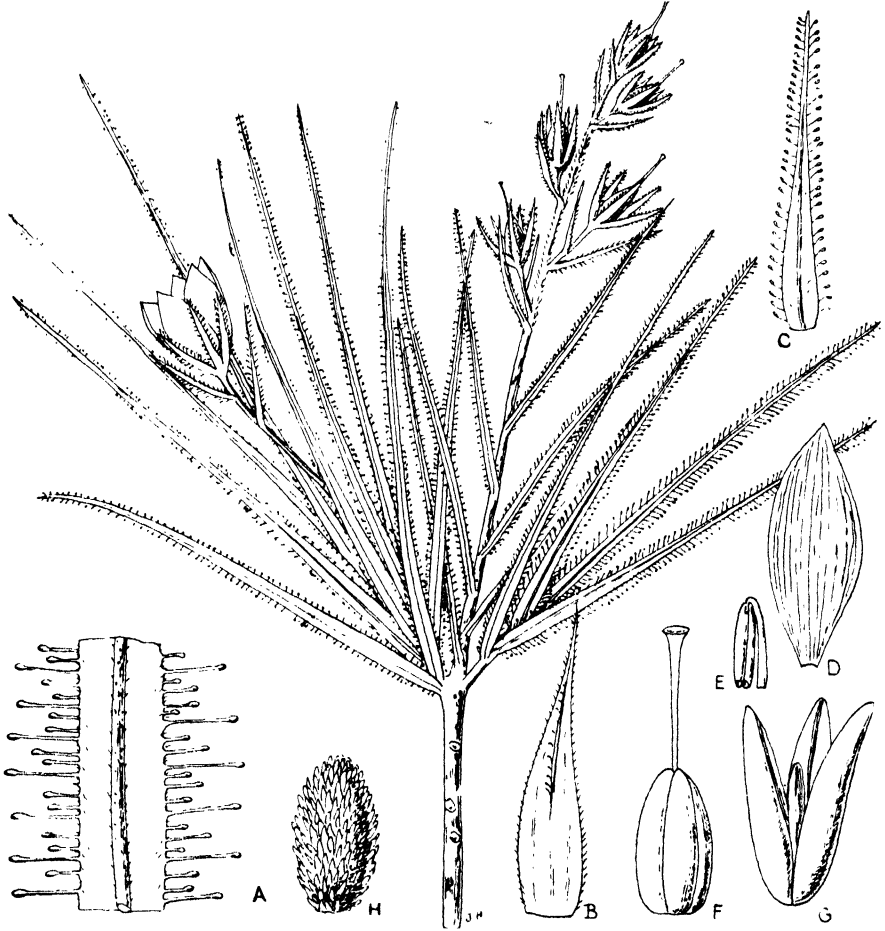
FOR some time now I had looked forward to my eastern journey; not without a little trepidation, for to an Englishman it seems a very long and winding trail from Cape Town to Durban, 1,161 miles, and from Durban to Pretoria, 443 miles. And it was rather questionable whether I should be able to get through the native territories and Natal before the rainy season, when travelling by car is frequently very difficult. Although a keen motorist, I have never had the opportunity to become more than an indifferent mechanic, and the intricacies of a dynamo or clutch were at that time beyond my knowledge. I had only a few hours to prepare for this long trek, which began in the early morning of 30th October, and terminated at Pretoria on 13th December. I started off with a fairly full car and accompanied by Mr. Jan Gillett, of Oxford, a keen young botanist then on a visit to South Africa with his parents.

We set off in light spirits for Cape Town, in order to pick up Dr. Marloth, who had kindly consented to accompany us for a few days. We found him at his laboratory ready and eager for the journey, and we were soon on the way, the little car packed full and almost down on its springs, our guest having brought more impedimenta than we had expected.

The route across the Cape Flats being now quite familiar to me, we travelled as fast as the rather bad road would allow us, soon reached Somerset West, and paused at the village at the foot of Sir Lowrys Pass. The Pass itself seemed higher than ever to my anxious eyes, for I was rather doubtful if the little Citroën, with only a 10-h.p. engine, and weight equivalent to quite six adult passengers, would be able to gain the top. My doubts were soon confirmed, for half-way up the rather steep hair-pin bend the engine began to boil, and a halt had to be called to allow it to cool. Meanwhile my two companions proceeded to ascend on foot, Jan greatly relieved to escape from the niche in the back of the car into which he had somehow managed to squeeze himself. By easy stages we at last reached the top, the weather being now very hot, with a certain amount of haze in the distance. At Grabouw, a collecting-place of Rudolph Schlechter, and now in the midst of forestry plantations, the cooling fan set up a loud screech, and we called at the garage to have it overhauled. In motoring in South Africa one quickly learns that it is not wise to neglect the greasing of vital parts, the intense heat rapidly causing them to dry up.

We stopped at the top of Viljoens Pass, about 9 miles beyond Grabouw, and collected some interesting plants in swampy ground on the right-hand side of the road. Here Dr. Marloth pointed out to us

a considerable stand of the rare and interesting *Roridula Gorgonias* Planch. (No. 1072), which was then in young fruit some distance into the swamp and reached only with difficulty. I was delighted to see *in situ* this remarkable plant, for *Roridula* and an allied genus, *Byblis*, were formerly very artificially placed in the DROSERACEAE, probably



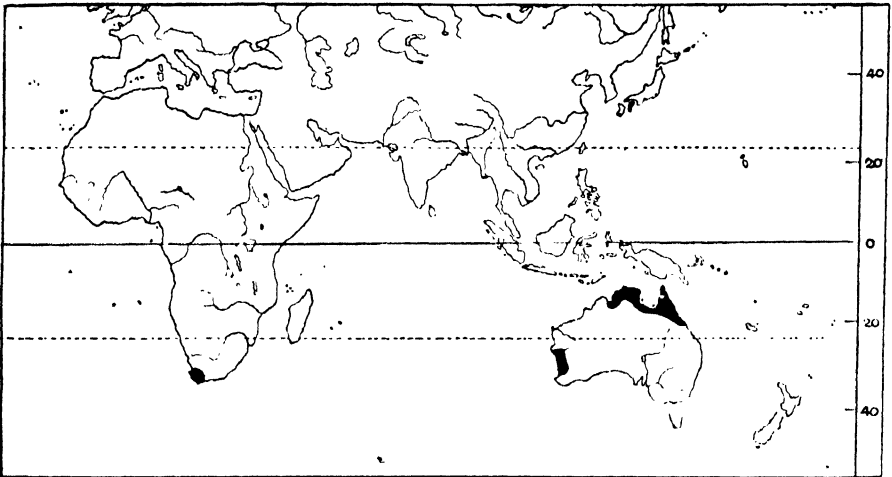
Roridula Gorgonias Planch. (BYBLIDACEAE), a rare and interesting plant.

A, portion of leaf, showing the glandular hairs on the margin; B, bract; C, sepal; D, petal; E, anther; F, pistil; G, capsule; H, seed.

mainly on account of their supposed insectivorous character, the leaves apparently bearing gland-tipped processes, as in *Drosera*. But the flowers of these two genera differ considerably from those of other DROSERACEAE, and in my own phylogenetic arrangement I treated them as a separate family, placing them next to PITTOSPORACEAE and TREMANDRACEAE. Both these latter families are richly represented in Australia, and Bentham, in the *Flora Australiensis*, remarked on the remarkable resemblance in structure of *Byblis* and *Cheiranthra* (PITTOSPORACEAE). The supposed affinity with DROSERACEAE was obviously based on superficial characters.

Indeed, Marloth's observations and experiments seem to show that *Roridula* is not even insectivorous, as was formerly supposed. Although plants are usually covered with flies and other insects, their capture is merely accidental, and their juices are not absorbed, as in the case of *Drosera*. Marloth also observed that *R. dentata*, the second species, was inhabited by spiders which move freely on the plant and prey on the insects captured by the leaves, and that a hemipterous insect, *Pameridea roridulae* Reuter, which was equally immune against the viscid secretion, assisted in the pollination by piercing the irritable connection of the anthers for the sake of its sugary contents, thereby producing the sudden turning of the anthers and the ejection of its pollen.

I have shown on a sketch-map the distribution of this interesting family, *Roridula* being confined to the south-western part of Cape



Geographical range of the family BYBLIDACEAE; one genus, *Roridula*, with two species in South Africa, the other genus, *Byblis*, with two species in Australia.

Province, and the *Byblis* to Western and North-eastern Australia. In South Africa the family is represented by two species, *Roridula dentata* L., recorded from Clanwilliam, Tulbagh, and Swellendam divisions, and *R. Gorgonias* Planch., from the Caledon and Swellendam divisions.

Here and there ¹ were beautiful examples of COMPOSITAE, *Phaenocoma prolifera* (Linn.) Don (No. 1081), with tiny cone-like branchlets and bright-pink or carmine bracts, and another everlasting, *Helichrysum sesamoides* Thunb. (No. 1076), with closely appressed ericoid leaves and creamy-white bracts, sometimes tinged with pink. *Drosera capensis* L., woody at the base, with sticky oblanceolate leaves and

¹ Other plants gathered here were: No. 1073, *Spatalla prolifera* Knight (PROTEACEAE); shrublet 2 ft.; leaves closely set, ericoid; heads woolly. 1074, *Helipterum gnaphaloides* DC. (COMPOSITAE), with canous linear leaves, tips of bracts sharply reflexed; 1075, *Erica campanulata* Andr. (ERICACEAE); 1080, *Borbonia parviflora* Lam. (PAPILIONACEAE), shrublet 1½ ft., leaves cordate with scabrid margins, and heads of yellow flowers.



[Photogr. I. B. Pale Evans.]

Vegetation typical of the Little Karoo near Ladismith, Cape Province.



[Photogr. : I. B. Pole Evans.

Species of "Mesembryanthemum" among the stones in the Karoo near Touwsberg.



[Photogr.: I. R. Pede Evans.

Scenery typical of the Karoo near Laingsburg, Cape Province.



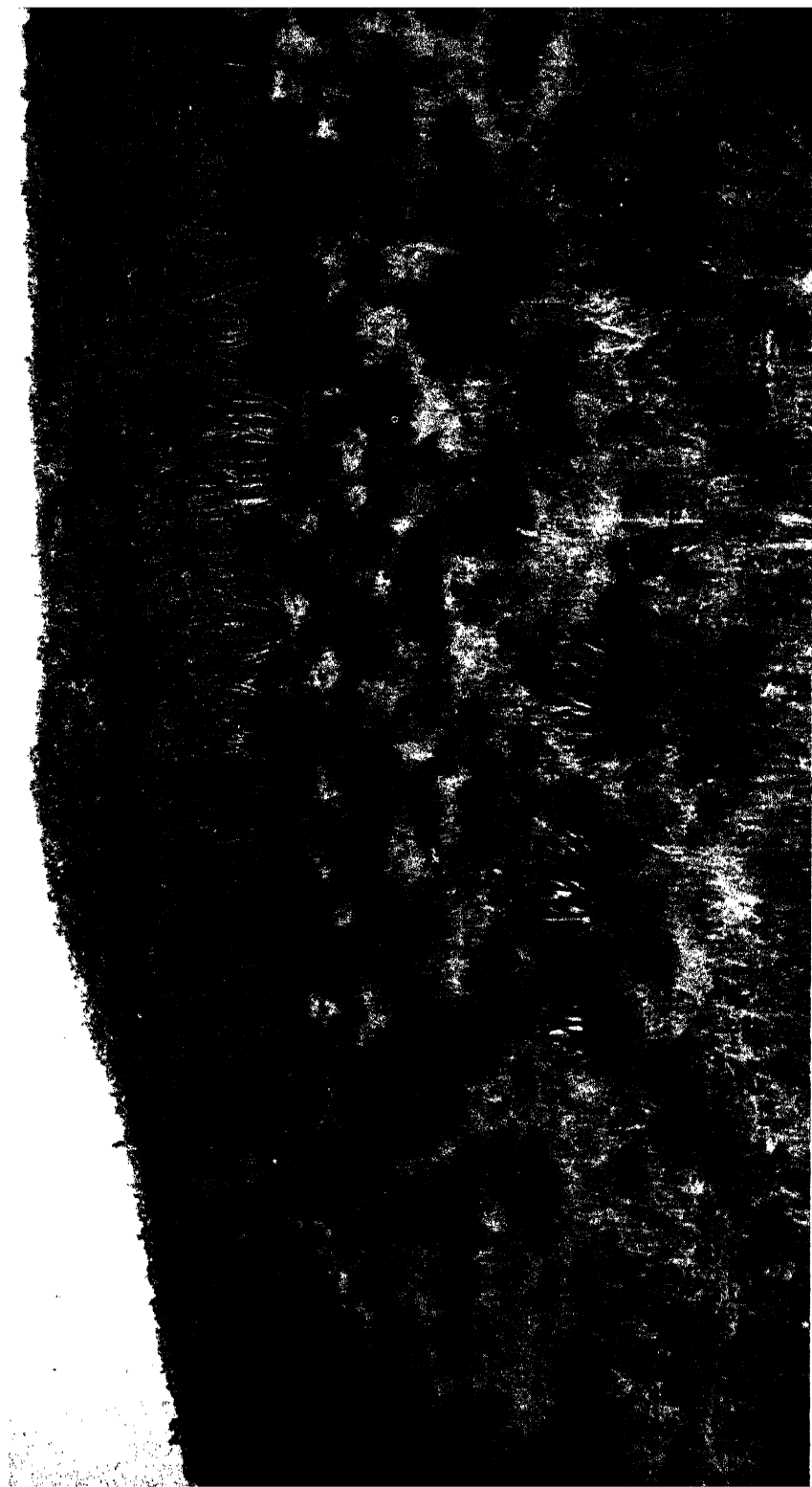
[Photogr. : I. B. Fole Evans.]

The Karoo near Prince Albert.



[Photogr. : I. B. Pote Evans.

One of the "Gous blooms", *Arctotis stoechadifolia* Berg. (COMPOSITAE), near Prieska in the heart of the Karoo region.



The "Gift boom", *Euphorbia virgata* Willd. (EUPHORBACEAE), was formerly used by the Bushman as an arrow poison; near Prieska in the heart of the Karoo region.
[Photogr. : I. B. Pole Evans.]



(Photogr.: I. B. Pale Evans.

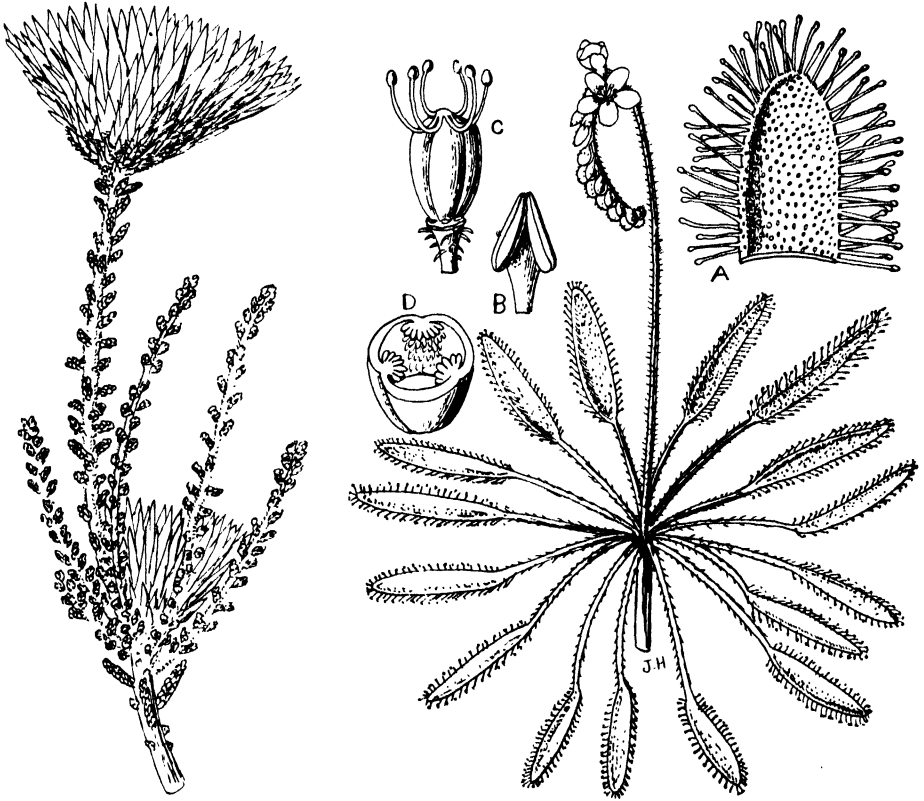
The "Driedoorn", *Rhizoglossum trichotomum* Burch. (Bryozoa: BRYOZOA), near Kogas, in the Prieska Division,



[Photogr.: I. B. Pole Evans.

Aloe Pictavarum Pole Evans (LILIACEAE) and other spiny vegetation in M'Pahlela's Location, in the Kalahari.

magenta flowers in a scorpioid cyme, grew also in the swamp. A *Protea*, *P. glaucophylla* Salish. (No. 1082), was prostrate on the ground, with long-stalked broadly oblanceolate leaves and glabrous reddish-brown bracts. The family HAEMODORACEAE was represented by *Dilatris Pillansii* Barker (No. 1079), with tufted linear leaves and long pedunculate heads of pale mauve-blue flowers. Other striking plants were *Watsonia Meriana* Miller (No. 1070) (IRIDACEAE), *Gnidia oppositi-*



Phaenocoma prolifera (Linn.)
Don (COMPOSITAE), a beautiful everlasting with bright pink or carmine bracts.

Drosera capensis Linn. (DROSERACEAE).

A, portion of leaf, showing gland-tipped cilia; B, anther; C, gynoeceium; D, cross-section of ovary.

folia L. (No. 1077) (THYMELAEACEAE), and *Lobostemon echiioides* Lehm. (No. 1078) (BORAGINACEAE).

The road for the rest of the distance to Worcester was very dusty and not at all pleasant at this season of the year, and the extensive sheet of water at Brand Vlei looked cool and inviting as we passed. Beyond Worcester, where the typical Cape flora comes to an abrupt termination and that of the Karoo begins, we entered very dry and rather uninteresting country covered with much *Rhenoster* Bush arriving at Robertson soon after tea, showing a day's run of 143 miles, which was quite a good performance for such a small car. Outside our

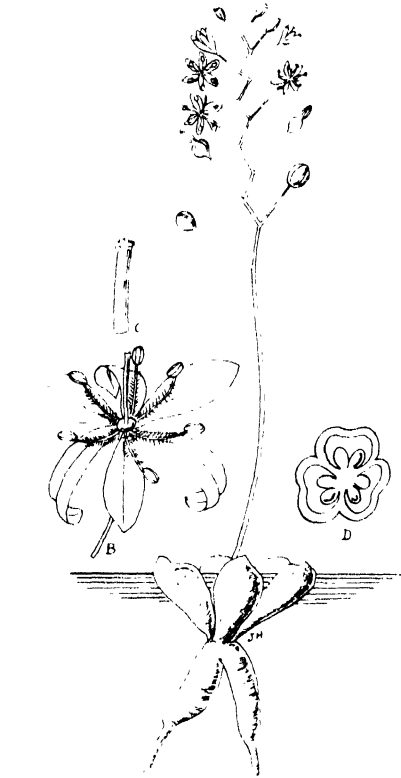
hotel were beautiful trees of *Melia Azedarach* Linn. in flower and fruit, the "Persian Lilac", and called "Syringa" in South Africa, and graceful examples of the Pepper tree, *Schinus molle* Linn.

At Robertson we provided ourselves at the store with a plentiful supply of stout brown paper bags, which are so useful when collecting small succulent plants such as *Conophytum*. From Robertson to Montagu and on to Barrydale the botanising was poor, the whole of this part of the Little Karoo suffering badly from a lengthy drought at that time.

At 2 miles west and 4 miles east of Robertson ¹ we added a few plants to our presses, including a striking species of *Cotyledon*, *C. decussata* Sims (No. 1083), with narrow fleshy leaves, and a corymb of dull scarlet flowers on a long peduncle, a lycopod-like *Crassula*, *C. lycopodioides* L. (No. 1084), with small yellow flowers, and *Anacampseros lanceolata* DC. (No. 1086A) (PORTULACACEAE), with fleshy sharp-pointed leaves, long thread-like stipules, and pale magenta flowers. Hereabouts grew an interesting example of a water-glass plant, *Bulbine mesembryanthemoides* Harv. (No. 1088) (LILIACEAE), whose fleshy leaves are buried almost completely during drought, except for the tips, through which the light penetrates.

I give a figure of this most interesting plant, with its strikingly zigzag inflorescence.

After lunching near a stream we called at Mr. Foullarde's fruit farm, where we were very hospitably received. I was much interested to see the thousands of beautiful Citrus trees laden with fruit, the methods of irrigation, and the grad-



Bulbine mesembryanthemoides Harv.
(LILIACEAE).

A, level of soil; B, flower; C, stigma.—Habit original, dissections after Hook. *1c. Plantarum*.

ing and packing arrangements for dispatch to the Cape Town market. With good irrigation the fertility of this otherwise dry and arid Karoo soil is truly amazing. After a welcome rest we started off again, our already overloaded car bearing an additional seven or eight dozen delicious ripe oranges, which provided us with a healthy fruit diet almost as far as Grahamstown. About 5 miles east of the farm we

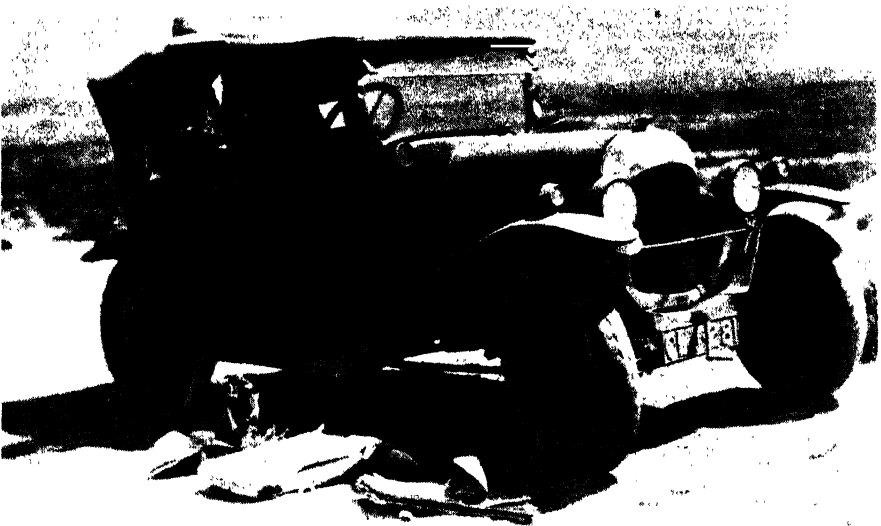
¹ Other plants collected : No. 1085, *Euryops tenuissimus* Less. (COMPOSITAE), shrub 3 ft., rays and disk yellow ; 1086, *Dicoma spinosa* (L.) Druce (COMPOSITAE), bracts purplish and white ; 1087, *Crassula rupestris* Thunb. (CRASSULACEAE), leaves connate at the base, flowers very small, white ; 1089, *Pentzia incana* O. Ktze. (COMPOSITAE) ; slender branches, leaves petiolate, pinnately divided, hoary ; heads very small, solitary ; pappus large and split down one side.

stopped to examine a quartzite kopje, where we found several interesting specimens of *Mesembryanthemum* (sensu lato), some of which were collected for growing at Kew.

The neighbouring Cogmans Kloof, a classical hunting-ground of some of the early collectors, was badly dried up, and yielded only three species in flower as far as we penetrated. These were *Athanasia parviflora* Linn. (No. 1090) (COMPOSITÆ), a shrub up to 10 ft., with pinnatipartite leaves and dense corymbs of very small bright-yellow flower-heads; fairly common and very handsome; *Chilanthus arboreus* (L. f.) A. DC. (No. 1091) (LOGANIACEÆ), a tree 15 ft., with dense cymes of minute white flowers smelling like hay; and *Crassula Cotyledon* Jacq. (No. 1092), dwarf, with obovate fleshy leaves and corymbs of white flowers.

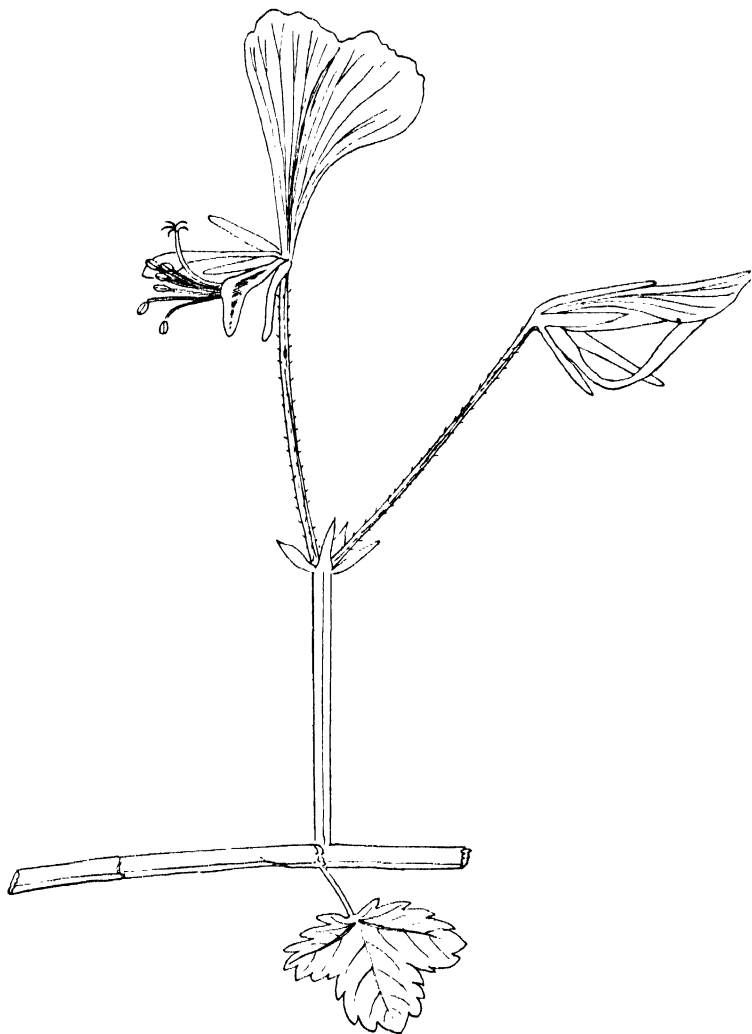
We collected a few plants half-way between Montagu and Barrydale,¹ including a very handsome *Euryops*, *E. tenuissimus* Less. (COMPOSITÆ) (No. 1094), a shrub 3-5 ft., with acicular leaves and very numerous long-pedunculate yellow flower-heads bunched at the top of the shoots; it was quite common in this subdesert country, showing the success and adaptability of some COMPOSITÆ. The weird *Pelargonium tetragonum* L'Herit., well known in cultivation, grew among the arid rocks on low kopjes, with almost leafless angular stems up to 5 ft. long, and the two posterior petals white and striped with carmine.

¹ Other plants collected: No. 1093, *Mesembryanthemum* sp. (FICOIDACEÆ); 1095, *Erica racemosa* Thunb. (ERICACEÆ).



The author and his small Citroën car in the hot and dry Little Karoo of South Africa.

Near Barrydale ¹ a few typical Karoo plants were collected, and we were glad to call a halt at Warmbad, where we arrived after dark, grateful indeed to gain the cool comfort of the small hotel after a very hot and tiring day.



Pelargonium tetragonum L'Hérit. (GERANIACEAE), with almost leafless angular stems, the two posterior petals white and striped with carmine.

Next morning (1st November), having overhauled and greased the car, we said good-bye to Dr. Marloth, my younger companion now occupying the more spacious front seat and free from the impedimenta in the back. The beat of the engine, too, was not quite so heart-

¹ No. 1097, *Pteronia incana* DC. (COMPOSITAE); 1098, *Lobostemon echioides* Lehm. (BORAGINACEAE); 1099, *Relhania genistifolia* L'Hérit. (COMPOSITAE); 1100, *Metalasia pungens* Don (COMPOSITAE), and 1101, *Passerina obtusifolia* Thoday (THYMELAEACEAE).



A "spitzkop" near Warmbad in the Little Karoo.

breaking as formerly, when so much overloaded, and, to our relief, we had less trouble with overheating on the hills. We returned on our tracks for about 7 miles, wishing to examine a remarkably perfect pile of quartzite which we had noted in the gathering darkness the night before. It was about a mile from the road, 400–500 ft. high, and we dubbed it the "spitzkop", for want of any name which it may have locally.¹ The small cap at the top was composed of another kind of rock, and carried quite a different vegetation from the rocks below. Dominant on the upper slopes was a fine species of *Pteronia*, *P. fasciculata* L. f. (No. 1102) (COMPOSITAE), a shrub 4 ft. high with densely imbricate narrow leaves with recurved tips, and yellow flower-heads clustered at the ends of the shoots (see figure, p. 198). I should say that the distribution of this plant is governed by the type of rock among which it grows; it is recorded from the Cedarbergen (Clanwilliam), Cogman's Kloof (Robertson), Grootafelberg (Worcester), Paarde Kloof (Laingsburg), and south of Hoek Plaats (Uniondale). At the foot of this kopje occurred another species of *Pteronia*, *P. pallens* L. f. (No. 1103), a shrublet 1½ ft. with pale-yellow flowers and acicular leaves. A tiny species of *Conophytum* was gathered for Kew.

We left this interesting spot about 11.30, and returned via Warmbad, collecting a few specimens near there,² and arrived at Ladismith in the

¹ This spitzkop lies very near Lemoenshoek.

² Collected near Warmbad: No. 1132, *Lebeckia cytisioides* Thunb. (PAPILIONACEAE); 1133, *Lasiospermum bipinnatum* (Thunb.) Druce (COMPOSITAE); 1134, *Leucadendron eucalyptifolium* Buck (PROTEACEAE); 1135, *Leucospermum attenuatum* R. Br. (PROTEACEAE); 1136, 1137, *Kniphofia aloides* Mönch. (LILIACEAE).

late afternoon, sending off at once by post a package of succulents for Kew. In the evening an excursion was made to the Waterkloof in the mountain range to the north (Roode Berg), and we gathered a fine lot of interesting plants, including a very lovely *Lampranthus*, L., *coralliflorus* N.E. Br. (No. 1108), which carpeted the ground, with



Pteronia fasciculata Linn. f. (COMPOSITAE),
dominant on the upper slopes of a "spitz-
kop" near Warmbad.

bright magenta flowers as big as a china aster, giving quite a colour to the upper part of the kloof; also splendid examples of the beautiful legume of which I had seen only one specimen, in Bains Kloof, *Hypocalyptus sophoroides* (Berg.) Druce. This Waterkloof near Ladismith yielded about thirty additional species of the typical South-Western Cape flora to my collection; these are arranged below in systematic order.

Collected in the Waterkloof, Ladismith

LIGNOSAE (WOODY DICOTYLEDONS)

ROSACEAE—*Cliffortia crenata* Linn. f. (No. 1123): shrub, 4-5 ft.; branchlets densely covered with overlapping orbicular crenate leaves about 1.5 cm. diam.

PAPILIONACEAE—*Hypocalyptus sophoroides* (Berg.) Druce (No. 1107) (see figure, p. 184). *Rafnia axillaris* Thunb. (No. 1106): shrub 3 ft., with simple lanceolate leaves and subsolitary yellow flowers; pods acute. *Aspalathus mierothon* Benth. (No. 1128): shrub 1½ ft.; leaves short and ericoid, fasciculate; flowers yellow, small, solitary.

- THYMELAEACEAE—**Passerina obtusifolia** *Thod.* (No. 1104): shrub 3½ ft.; leaves ericoid on woolly branchlets; flowers dull red.
- POLYGALACEAE—**Polygala ericifolia** *DC.* (No. 1127): slender shrub with small ericoid leaves and almost solitary pink flowers.
- ERICACEAE—**Erica caffra** *Limn.* (No. 1112): tall shrub 12 ft. high; leaves pubescent; flowers greenish-white, corolla pubescent.
- RUBIACEAE—**Anthospermum aethiopicum** *L.* (No. 1124): shrub 2 ft.; leaves whorled, shortly acicular.

HERBACEAE (HERBACEOUS DICOTYLEDONS)

- MOELLUGINACEAE—**Adenogramma sylvatica** *Fenzl.* (No. 1120): weak herb with distant whorls of ovate-lanceolate leaves tipped by a bristle-like hair; flowers very small.
- COMPOSITAE—**Heterolepis aliena** (*Limn. f.*) *Druce* (No. 1111): on cliffs; small shrub with woolly branchlets; leaves linear, woolly below; flower-heads dark green in bud (see also figure, p. 188). **Hellechrysium fastigiatum** *Harr.* (No. 1117): 2–3 in. high, woolly and much branched; heads sessile, with straw-coloured bracts. **H. paniculatum** *Thunb.* (No. 1125): silvery very narrow bristle-pointed leaves, and corymbs of heads with white bracts. **Leyssera gnaphalioides** *Limn.* (No. 1115): much-branched shrublet with narrowly acicular woolly leaves, pale yellow flower-heads on slender peduncles. **Othonna amplexicaulis** *Thunb.* var. **denticulata** *Harr.* (No. 1131): tall, up to 5 ft.; leaves narrowly obovate, semi-amplexicaul, closely denticulate; corymbs of numerous small yellow flower-heads. **Senecio juniperinus** *L. f.* (No. 1114): shrub 2 ft.; branches woolly; leaves auriculate at the base, narrowly lanceolate, margins recurved, woolly below; flower-heads laxly corymbose, yellow. **Berkheya lanceolata** *Willd.* (No. 1110): on cliffs; 1 ft. high; woolly, very narrow prickly leaves; yellow solitary subsessile flower-heads.
- SCROPHULARIACEAE—**Manulea parviflora** *Benth.* (No. 1126): virgate stems from linear-spathulate basal leaves; flowers bronze-yellow; an interesting record and equal to Fourcade 3571 from Avontur Poort (2600 ft.) in January 1928; also recorded from Walmer, near Port Elizabeth, but previously known only from Transkei, Natal and the Transvaal, whence it extends into Tropical Africa.
- ACANTHACEAE—**Blepharis capensis** *Pers.* (No. 1130): very spiny subshrub with white flowers.
- GERANIACEAE—**Pelargonium violarium** *Jacq.* (No. 1105): under rocks; softly pubescent all over the small dentate leaves; petals white with broad band of crimson on each petal. This is called **P. tricolor** *Curt.* in *Engl. Pflanzenr.*, a species dating from 1794, whilst Jacquin's name dates from 1786–93. **P. trichophorum** *Hutch. n. sp.*¹ (No. 1109): larger petals crimson with darker blotch. **P. scabrum** *Ait.* (No. 1113): shrub 3½ ft.; leaves palmately lobed, scabrid; petals pink, streaked with deep crimson.

¹ **Pelargonium trichophorum** *Hutch. sp. nov.* foliis ellipticis serrato-crenatis longe piloso-ciliatis umbellis bifloris valde distincta.

Rhizoma procumbens, gracile, superne petiolis persistentibus indutum. Folia graciliter petiolata, elliptica, basi rotundata vel subcoarctata, apice ambitu rotundata, circiter 2 cm. longa et 1.5 cm. lata, serrato-crenata, utrinque parce setulosa, marginibus longe piloso-ciliatis; nervi laterales utrinsecus 4–5; petioli 3–5 cm. longi, longe pilosi. Inflorescentiae foliis duplo longiores; pedunculi graciles, pilosi; involucri bracteae circiter 5, ovato-acuminatae, 5 mm. longae, rubescentes; pedicelli graciles, 3–3.5 cm. longi, molliter pilosi. Sepala oblongo-elliptica, acuta, 1 cm. longa, viridia vel rubescentia, longe pilosa. Petala majora spatulato-obovata, 1.5–1.8 cm. longa, carminea, basin versus maculo magno atro-carmino ornata, minora lineari-spatulata, pallida, 4 mm. longa. Filamenta roseo-albida. Ovarium dense pilosum; stylus 7 mm. longus, 5-lobatus.

Ladismith Div.: Waterkloof, near Ladismith, 2000 ft., 6–9 in. high, larger petals crimson with dark blotch, 1st November, 1928, *Hutchinson* 1109 (type in Kew Herbarium).

MONOCOTYLEDONS

LILIACEAE -- **Dipcadi hyacinthiflora** (Berg.) (No. 1129): leaves linear, one or two from each bulb; flowers dull brown, few in slender racemes. **Ornithogalum aureum** Curt. (No. 1116): a white form, which seems distinct from **O. thyrsoideum**.

GRAMINEAE -- **Brachiaria serrata** Stapf (No. 1122): erect, 9-12 in. high; leaves short and sharp pointed, sharply toothed on the inrolled margins; spikelets mauve. **Ehrharta calycina** Sm. (Nos. 1118, 1121): 2-3 ft., glaucous; leaves with wavy margins; panicles slender.

The town of Ladismith is a pleasant little place with a good modern hotel and is an excellent centre for exploring the neighbouring mountains, which in a good season might yield some very interesting species.

Owing to our late return from collecting in the kloof the previous evening, we did not start on the morning of 2nd November until ten o'clock (a late start for South Africa!), after having posted specimens to the Bolus Herbarium, where Mrs. Bolus had most kindly arranged to have their drying completed. This saved carrying with us our partly dried specimens, sparing the car and allowing us to devote most of our time to collecting. Our primary objective this day was the famous Seven Weeks Poort, but at this time of the year we found it somewhat disappointing botanically and we made a poor "bag". We collected the fine *Pelargonium zonale* (No. 1140), one of the parents of the common garden bedding "Geranium"; and a few other plants.¹ From the Poort we proceeded through rather dry and uninteresting country towards Calitzdorp, a poor-looking place suffering acutely from a very long drought. We took in petrol and oil, but could obtain no water for our radiator. I asked the garage man what they drank; he said "Beer"! However, I could not afford beer to stream away through the radiator, so we jogged along as best we could until we came to a small stream. Between Calitzdorp and the Cango Caves² we passed through some striking rock-formations on low hills at the foot of the Zuurberg, with brown, matrix-like soil and queer green patches peculiarly scarred by erosion. At the foot of one of these hills I noticed a singular type of native dwelling covered with straw, and went towards it with the intention of taking a photograph of the family seated around. On my approach, however, they all ran away and hid themselves. I set up the camera and gazed unconcernedly in the opposite direction, and was rewarded at length by a face peeping from the doorway. I held up a coin, and immediately the whole family turned out and lined up to be photographed. After the reward of a shilling they waved me a friendly good-bye, laughing in their rich, intoxicating way at the trick they had played on me. However, it was tit for tat, and I had secured a photograph.

¹ Collected at Seven Weeks Poort: No. 1138, *Erica Corydalis* Salisb., 3 ft., flowers white; 1139, *Aster filifolius* Vent. (COMPOSITAE).

² Between Calitzdorp and Cango Caves: No. 1141, *Erica mammosa* Linn., shrub 3 ft., flowers greenish-yellow; 1142, *Nymania capensis* (Thunb.) Lindm. (see p. 63) (SAPINDACEAE); 1143, *Polygala pinifolia* Lam. (POLYGALACEAE); shrub; leaves shortly linear; flowers few, crimson. 1146, *Cynanchum obtusifolium* L. f. (ASCLEPIADACEAE); twiner, up to 20 ft., leaves ovate-elliptic, mucronate; flowers in extra-axillary umbels; calyx and corolla green; corona white; fruit pointed, 6 cm. long; seeds with a long silky coma.

About 30 miles from Ladismith, near Warmbad, a few characteristic "Cape" plants were met with: *Lebeckia cytisoides* Thunb. (PAPILIONACEAE) (No. 1132), a shrub 3 ft. high, with trifoliolate leaves, the leaflets narrowly oblanceolate and closely adpressed-pubescent; flowers yellow in short racemes; *Lasiospermum bipinnatum* (Thunb.) Druce (COMPOSITAE) (No. 1133), Chrysanthemum-like, with white rays and very woolly achenes; *Leucadendron eucalyptifolium* Buek (PROTEACEAE) (No. 1134), a shrub 4 ft., with linear apiculate glabrous leaves



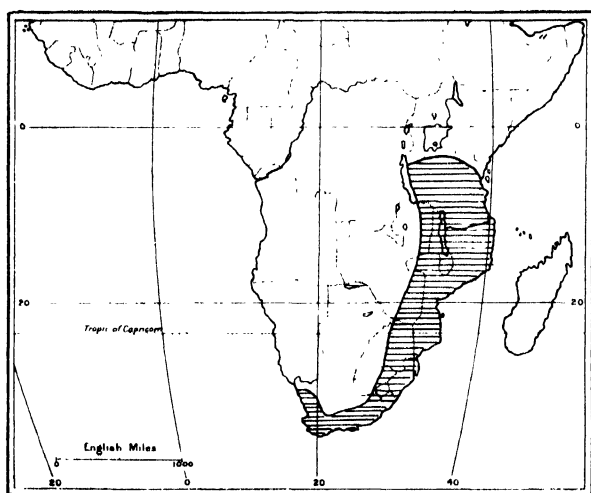
Kiggelaria africana Linn. (FLACOURTIACEAE), a widely spread and variable species.

A, male flowering shoot; B, fruiting shoot; C, male flower; D, petal of male flower showing scale; E, anther; F, female flower; G, petal of female flower; H, pistil; I, cross section of ovary; J, seed.

and oblong female cones with broad hairy scales; *Leucospermum attenuatum* R. Br. (PROTEACEAE) (No. 1135), with truncate oblanceolate leaves toothed at the top, and dense heads of red flowers, the styles orange-yellow; *Kniphofia aloides* Moench (LILIACEAE) (Nos. 1136, 1137), in stream-bed, with orange and red flowers.

After a long and rather tiresome journey, for towards twilight we became somewhat uncertain of our route, we reached the Cango Hotel about seven o'clock. On the steep descents towards Calitzdorp we had some anxious moments, a few of the tortuous bends being rather

dangerous, especially in the Huis River Berg, and it meant brakes and low gear for considerable periods. Altogether this had been a travelling day, and we had collected practically nothing by the way, although one small tree encountered is of great interest. This was our No. 1145, *Kiggelaria africana* L., belonging to the FLACOURTIACEAE. I believe there is only one very variable species of this African genus, showing a great range in the degree of indumentum, from quite glabrous leaves to softly and densely tomentellous. I give below¹ the full synonymy, taking the view that there is only one species, which ranges wherever there is forest, right from the kloofs of the Cape Peninsula to the Khamiesberg in Namaqualand, and through the south and eastern districts as far as the mountains of Tanganyika. This range is shown on the accompanying map, indicating *Kiggelaria* to be



Range of *Kiggelaria africana* Linn. (FLACOURTIACEAE),
a very variable small tree.

one of the several species which have spread from the tropics southwards, for its nearest relatives are nearly all tropical genera.

By the roadside a striking plant was *Melanthus comosus* Vahl (MELIANTHACEAE) (No. 1144), softly woody, with pinnate canescent leaves and brick-red petals within a large saccate calyx, and with bladder-like fruits. According to Bryant (Herb. Kew) the local name in Prieska is "Kruidjie-roer-my-nie" (Herb touch-me-not), on account of the offensive odour. The plant has medicinal uses,² and is poisonous to stock.

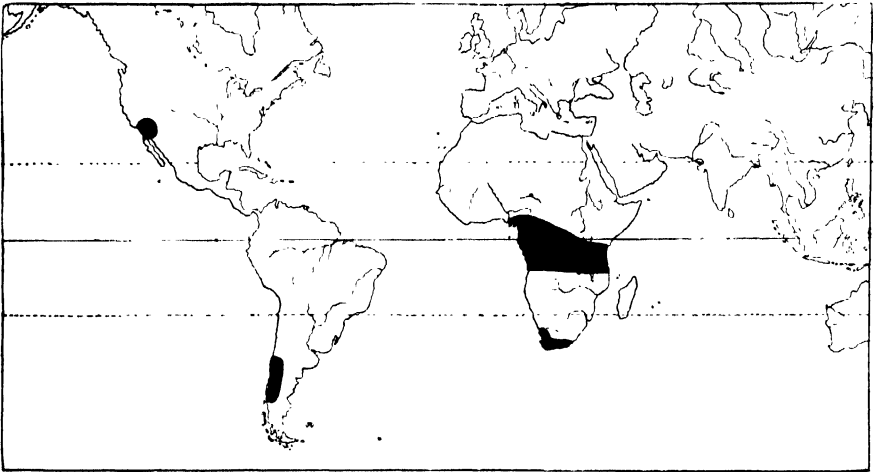
¹ *Kiggelaria africana* Linn. *Sp. Pl.* ed. 2, 1466 (1763); Harv. in Harv. & Sond. *Fl. Cap.* 1: 71 (1859). *K. integrifolia* Eckl. & Zeyh. ex Harv. *l.c.*, name only, non Jacq. *K. Dregeana* Turcz. in *Bull. Soc. Nat. Mosc.* 27, 2: 333 (1854). *K. glandulosa* Salisb. *Prodr.* 321 (1796). *K. ferruginea* Eckl. & Zeyh. *Enum.* 15 (1834). *K. grandifolia* Warb. in *Engl. Pflanzenw. Ost.-Afr. C.* 278 (1895). *K. serrata* Warb. ex Engl. in *Abh. Preuss. Akad. Wiss.*, 23 (1894). *K. hylophila* Gilg in *Engl. Bot. Jahrb.*, 40: 469 (1908).

² See Watt and Breyer-Brandwijk, *Medicinal and Poisonous Plants of Southern Africa*, 113 (1932), and Steyn, *Toxicology of Plants in South Africa*, 304 (1934).



The next day (2nd November) made up for the previous day's paucity in plants, for we went back on our route for a few miles and ascended the Zwartberg Pass for some distance until we arrived at a large lateral kloof on the right-hand side. At the bottom of the pass were large groves of a tall *Aloe*, about 8 ft. high, the hillsides being closely set with them. Here we collected a striking species of *Gasteria*, (No. 1147), with fleshy oblong leaves slightly toothed towards the apex, and red flowers tinged with green; also *Arctotis stoechadifolia* Berg. (No. 1148), a well-known cultivated species in Europe; and a sturdy species of *Albucca*, *A. altissima* Dryand. (No. 1150), with broadish lanceolate leaves in a pseudo-whorl, and green flowers.

• Another interesting plant to me personally was our No. 1149, *Cyanella lutea* Thunb., which also grew at the foot of the pass. It belongs to the small family TECOPHILAEACEAE, which is about intermediate between the LILIACEAE and IRIDACEAE, having only a semi-



Range of family TECOPHILAEACEAE.

inferior ovary. In the case of Monocotyledons particularly, the Southern Hemisphere contains some interesting links, and TECOPHILAEACEAE is nearly confined to that part of the world south of the Equator, with an outlying genus in California. I give a map to show the range of this interesting family and a figure of the *Cyanella*, showing the character of the ovary and the peculiar stamens, one of which is much larger than the others, perhaps foreshadowing the reduction to one stamen as found in the ORCHIDACEAE. Young students might like to ponder on such interesting points as these, which make taxonomic botany more interesting than it might appear to be.

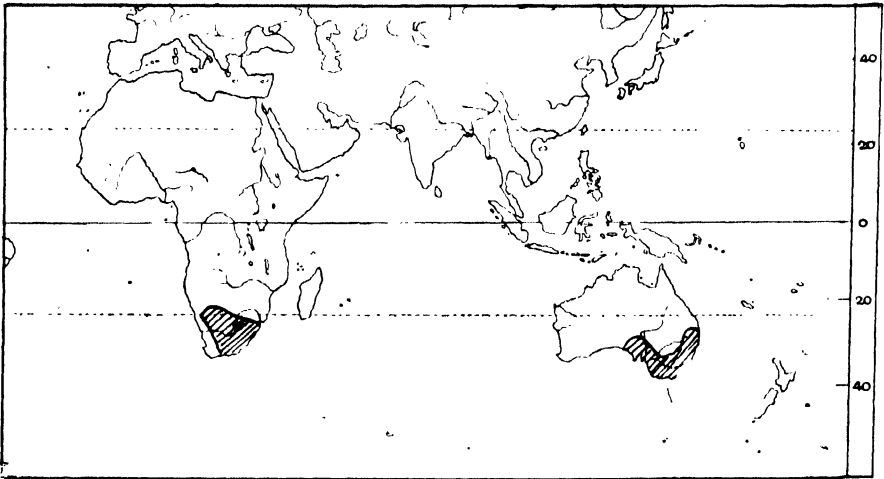
On the sides of the kloof just above the karoid vegetation we found the south-western flora, *Leucospermum attenuatum* R. Br. (No. 1151), again the beautiful crimson legume, *Hypocalyptus sophoroides* (Berg.) Druce, several species of *Pelargonium*, a fine *Pteronia*, *P. stricta* Ait. (No. 1167), very tall and lanky, and another tall Composite, *Stilpnophytum linifolium* Thunb. (No. 1157), with dense corymbs of yellow flower-heads.



Papaver aculeatum
Thunb. (PAPAVERA-
CEAE), the only poppy
indigenous in the
Southern Hemisphere.

I was delighted to collect here specimens of the only poppy indigenous in the Southern Hemisphere, a lone species resembling *P. dubium* of northern climes. This is *Papaver aculeatum* Thunb. (No. 1155), a prickly species with orange-yellow or orange-red flowers. On account of this prickly character, Fedde, the monographer of the family in Engler's *Pflanzenreich*, places it as the sole occupant of the section *Horrida*.

The distribution of this species is of very great interest, as it also occurs in South and South-eastern Australia, and it appears to be wild in both areas. In South Africa, for example, it occurs in the Aus Mountains of South-west Africa, on the banks of the Orange River, in the Prieska Division farther south, where Bryant records it as often abundant in good seasons and growing into bushy plants 2 ft. high; here in the Zwartberg Pass we, ourselves, found it at a considerable altitude, and McClean has gathered it on the upper slopes of the Mont



Range of the only poppy known from the Southern Hemisphere, *Papaver aculeatum* Thunb. (PAPAVERACEAE).

Aux Sources in the Drakensberg, at 10,000 ft., in grassland and among rocks, and it is common there! This plant may therefore grow at places varying very greatly in altitude, ranging from 2000 ft. to 10,000 ft.

I give a black-and-white picture of this species, as well as a map showing its approximate distribution in the two areas. Can it be that this is a "relict" species of a distinct group of poppies separately evolved in the Southern Hemisphere? If it had arisen from its northern congeners, then we should expect to find it or a related species in the eastern mountains of Tropical Africa; but so far no indigenous poppy has been found there. I commend phytogeographical studies such as these to the South African student. He may not in his country be able to follow "the trail of the lonesome pine", but he can at any rate trace the path of the "lonesome poppy".

Our collection in the Zwartberg Pass deserves arranging in systematic order for the use of botanists visiting about the same season of the year.

Plants Collected in the Zwartberg Pass, 3rd November, 1928

LIGNOSAE (WOODY DICOTYLEDONS)

- PAPILIONACEAE—**Psoralea pinnata** *L.* (No. 1165): shrub 6 ft., with whip-like branches and acicular glandular leaflets; flowers pale blue. **Hypocalyptus sophoroides** (*Berg.*) *Druce* (No. 1159). **Aspalathus thymifolia** *L. var. albiflora* (*Sond.*) (No. 1152): shrub up to 8 ft., with very small fasciculate leaves and small solitary white or yellow flowers. **Dolichos gibbosus** *Thunb.* (No. 1164): climber; leaflets ovate; flowers crimson.
- BRUNIACEAE—**Brunia nodiflora** *L.* (No. 1171): shrub with Lycopodium-like branchlets covered with scale-like leaves and woolly balls of small flowers about 2 cm. diam.
- PROTEACEAE—**Leucospermum attenuatum** *R. Br.* (No. 1151): a bush 5 ft.; leaves oblong-ob lanceolate, 3-5-toothed at the apex; heads solitary or paired, golden yellow.
- EUPHORBIACEAE—**Cluytia alaternoides** *Müll. Arg.* (No. 1160): small glaucous shrub; leaves oblong. **Euphorbia epicyparissias** *E. Mey.* (No. 1173): 5 ft. high; branchlets densely covered with short linear leaves; heads corymbose, dense.
- ERICACEAE—**Erica nigrita** *Linn.* (No. 1161): shrublet 1½ ft.; calyx and corolla white, very short.
- LOGANIACEAE—**Buddleja salvifolia** *R. Br.* (No. 1151): shrub; leaves lanceolate, closely bullate; close panicles of pale-blue flowers.



A good "bag" from the Zwartberg Pass in the arm of Jan Gillett.

HERBACEAE (HERBACEOUS DICOTYLEDONS)

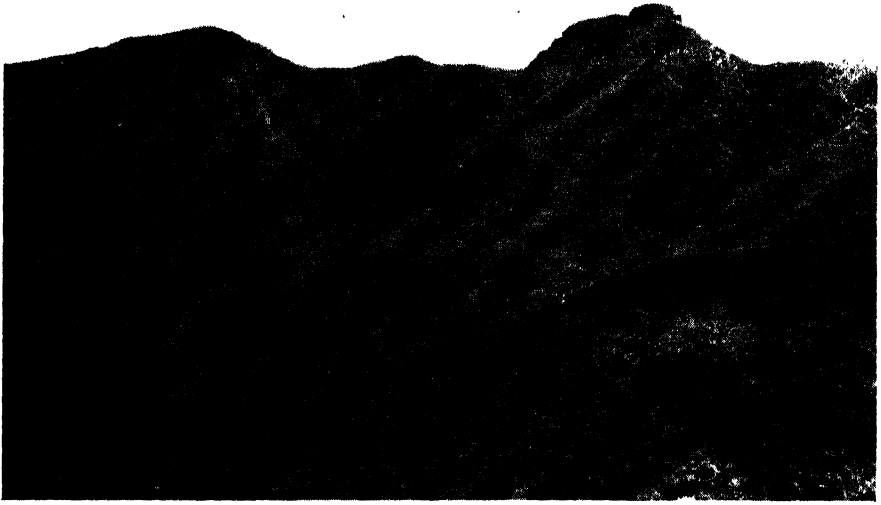
- PAPAVERACEAE—**Papaver aculeatum** Thunb. (No. 1155) (see notes, p. 206).
 UMBELLIFERAE—**Peucedanum ferulaceum** Thunb. (No. 1162): hemlock-like plant with finely dissected leaves, and many-rayed compound umbels.
 COMPOSITAE—**Pteronia stricta** Ait. (No. 1167): tall, lanky shrub, 6–8 ft. high, with fascicles of short acicular leaves and densely clustered corymbose yellow flower-heads. **Aster aethiopicus** Burm. (No. 1163): laxly branched small shrub; leaves sessile, oblong-elliptic, scabrid; flower-heads on long peduncles, rays white. **Helichrysum paniculatum** Thunb. (No. 1166): woolly and silvery, leaves linear with bristle-like points; flower-heads closely corymbose, bracts white or pink, disk-flowers yellow. **H. rotundifolium** Less. (No. 1169): very woolly and dwarf, leaves obovate; clusters of flower-heads sessile, bracts straw-coloured. **Stilpnophytum linifolium** Thunb. (No. 1157): with rod-like branches covered with short narrowly lanceolate keeled leaves, and dense corymbs of yellow flower-heads about 5 cm. diam. (— Fourcade 1680 from Avontuur). **Berkheya cruciata** Willd. (No. 1170): very prickly leaves, and small yellow flower-heads.
 GERANIACEAE—**Pelargonium divaricatum** Thunb. (No. 1158): shrubby; leaves short and much-dissected; flowers few, pink with a crimson spot. **P. tricolor** Jacq. (No. 1156). **P. populifolium** E. & Z. (No. 1174): 3½ ft.; leaves palmately lobed to the middle, sharply toothed; flowers pinkish-white. **P. scabrum** Ait. (No. 1172).

MONOCOTYLEDONS

- IRIDACEAE—**Gladiolus tristis** L. (No. 1153): flowers dull white with pink midrib.

The Congo Caves

In the afternoon I paid a visit to the famous Congo Caves. They are indeed one of the wonders of the world, and compared with the beautiful Cheddar caves in Somerset, which I had visited for the first time a few months before, are on a colossal scale. They lie roughly about 18 miles north of the town of Oudtshoorn, whence they may be most conveniently reached. One wonders on entering what were the feelings of the Dutch farmer named Van Zyl when he discovered these marvellous vaults just over a hundred years ago. No doubt he forgot all about the buck which he had been hunting and which had taken refuge therein. Until only a few years ago there was no efficient control, and many beautiful pieces were wantonly destroyed by souvenir-hunters. In 1921, however, the Municipality of Oudtshoorn took over the management of the caves, and have recently greatly added to the comfort of visitors by the installation of electric light. This fortunately occurred just a few days before my visit, and I found it a pleasure to explore the winding paths and varied beauty of the vaults, sometimes creeping through holes or sliding down steep slopes. The first chamber, Van Zyl's, is the largest of the caves, being about 150 ft. long, 200 ft. wide and about 70 ft. high. The roof bristles with stalactites. In this wonderful cave there are "Organ Pipes", a massive structure well named "Cleopatra's Needle", a huge stalagmite, which had been carefully measured for the last thirty-eight years before my visit. This shows that it has grown only an inch during that period, and from that one gets an idea of the untold ages which have passed since the beginning of the formation of these wonderful structures and the long-continued stability of the rock structure in this part of Africa. But



View in Montagu Pass.

Scrub composed largely of *Passerina*, *Erica*, *Berzelia*, *Leucadendron*.

this is not a guide-book, and I cannot spare the space to take the reader through the numberless other caves farther on. It is a pity, however, that they lack the charming rock-pools which are so beautiful a feature of the Cheddar caves.

We left Cango in the late afternoon, and by a good road arrived at Oudtshoorn in pouring rain. I mention this important fact because the district was suffering very badly from a long drought.

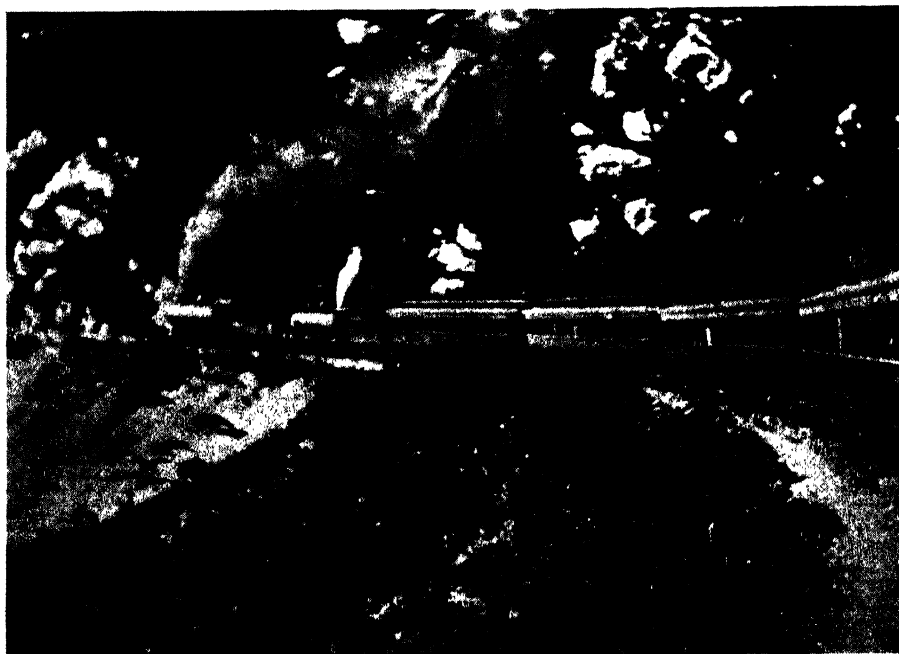
From Oudtshoorn we started off at nine o'clock *en route* for George, via the Montagu Pass. Before reaching the neighbourhood of the Pass the only plant collected was *Senecio juniperinus* L. (COMPOSITÆ) (No. 1175), a shrub with sharp-pointed narrow leaves woolly between the recurved margins. Near a stream at the northern entrance to the Pass we collected a host of interesting species, a welcome change from the arid conditions encountered in the Little Karoo. We bathed deliciously in a lovely deep pool, where my companion discovered overhanging the bank a beautiful very pale blue *Disa* speckled with carmine like a bird's egg, its charm being duplicated by its reflection in the water. This proved to be *Disa tripetaloides* N.E. Br. (No. 1194). The mountains here were green and with soft outlines, the depressions being well wooded with fairly large trees (see photograph above)—again a pleasing contrast to the rugged outlines of the Karoo kopjes. Here we were once more right in the midst of the typical "Cape" flora, the change being completed within the short distance of a quarter of a mile or so.



Top, the Montagu Pass;

bottom, a railway train ascending.

[Photogrs. by the Author.]



**Collected above Northern Entrance to Montagu Pass,
3rd November, 1928**

LIGNOSAE (WOODY DICOTYLEDONS)

- PAPILIONACEAE—**Psoralea pinnata** *L.* (No. 1181).
 BRUNIACEAE—**Berzelia commutata** *Sond.* (No. 1189): shrub with small ericoid leaves and small elliptic balls of white flowers in corymbs.
 PROTEACEAE—**Protea latifolia** *R. Br.* (No. 1193): sessile amplexicaul oblong leaves; large heads with the inner bracts spatulate and deep pink. **Leucadendron uliginosum** *R. Br.* (No. 1190): a miniature "silver-tree", 8-10 ft.; leaves silvery-silky; female bracts silky.
 ERICACEAE—**Erica glomiflora** *Salisb.* (No. 1187): corolla white, urn-shaped, dry. **E. cubica** *Linn.* (No. 1191): 2 ft.; flowers crimson, clustered into a terminal umbel; pedicels with stellate hairs.

HERBACEAE (HERBACEOUS DICOTYLEDONS)

- LOBELIACEAE—**Lobelia hirsuta** *L.* (No. 1179): straggly, with scattered oblong setose leaves and solitary blue flowers on long pedicels.
 COMPOSITAE—**Pteronia stricta** *Ait.* (No. 1188). **Athanasia trifurcata** *L.* (No. 1186): leaves imbricate, trifurcate; heads crowded in small corymbs, yellow. **Leontonyx glomeratus** *DC.* (No. 1177): small woolly herb with glomerate heads. **Stoebe alopecuroides** *Less.* (No. 1192): shrub with densely fasciculate acicular leaves and long fox-tail-like inflorescences. **Senecio multibracteatus** *Harr.* (No. 1180): tall slender herb with narrow jagged leaves and corymbs of mauve flower-heads.
 SELAGINACEAE—**Solago Dregel** *Rolfe* (No. 1183): 2 ft. high; flowers white.

MONOCOTYLEDONS

- LILIACEAE—**Kniphofia aloides** *Moench* (No. 1184) (see p. 201).
 IRIDACEAE—**Gladiolus grandis** *Thunb.* (No. 1176): leaves long and filiform. **Chasmanthe caffra** *N.E. Br.* (No. 1178): leaves narrowly linear; flowers scarlet; fruits pink.
 HAEMODORACEAE—**Wachendorfia thyrsiflora** *L.* (No. 1182): 5 ft.; flowers yellow, with a primrose scent.

Near the railway bridge over the road we made a fine collection, and I have arranged these in systematic order with plants collected lower down, and whilst descending from Power railway station a day or two later. The most striking was the lovely Papilionaceous *Virgilia oroboides* (Berg.) Salter (No. 1201).

One of South Africa's most interesting genera from a distributional point of view is *Cunonia*, and we soon found a fine tree of *Cunonia capensis* (No. 1230) about half-way down the pass. There is only this one endemic species in South Africa, occurring in the woods from Table Mountain and Bain's Kloof eastward to Natal. The remainder of the species of this very natural genus are found only in the island of New Caledonia, quite half-way round the globe. In New Caledonia there are perhaps a dozen endemic species, two of which have simple leaves and which seem to be the more primitive types. The CUNONIACEAE are thus a small austral family, and the South African representative is probably a relict species of a former wider distribution.

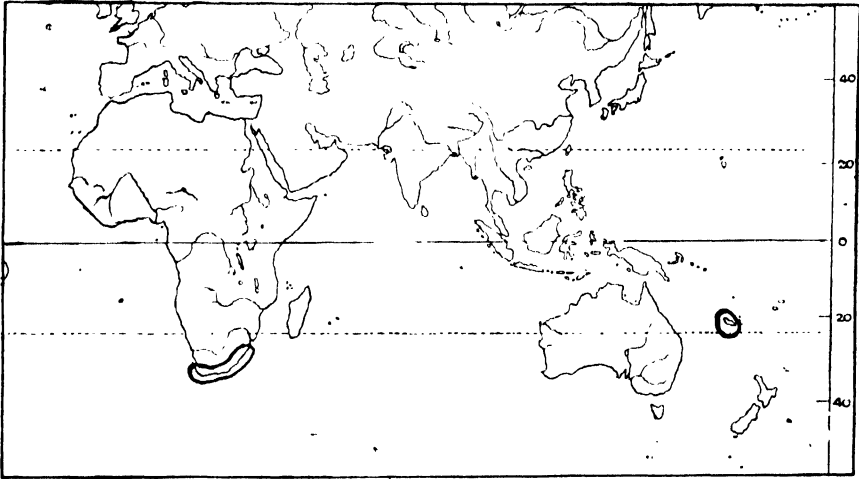
Whilst gathering the *Cunonia* we were surprised and delighted to meet Dr. Fourcade, of Witte Els Bosch, with full collecting kit and a four-seater car and "boy" ready to help us in every possible way.



Cunonia capensis Linn. f. (CUNONIACEAE), the only South African species of an austral genus, with a very interesting distribution (see map, p. 213).

A, flower; B, stamen; C, disk and pistil.

We proceeded to botanise under his guidance, and arrived at George at 6.30, after an interesting and profitable day, the remainder of the evening being devoted to pressing our plants. We enjoyed Dr. Fourcade's company and help for some time, and we stayed for two or three



Distribution of the very natural genus *Cunonia* (CUNONIACEAE); only one species in South Africa, about ten endemic in New Caledonia (see p. 211); a remarkable example of discontinuous distribution, probably relicts from a former wider range across a broad antarctic continent.

days at his residence at Witte Els Bosch, comparing notes and botanising in the neighbourhood.

The next day (5th November) we ran down towards the sea to Pacaltzdorp¹ through pleasant grassy country much like parts of England.

Plants Collected in the Montagu Pass

LIGNOSAE (WOODY DICOTYLEDONS)

PAPILIONACEAE—*Virgilia oroboides* (Berg.) Salter (*V. capensis* Lam.) (No. 1201) (see notes, p. 211). *Podalyria glauca* DC. (No. 1206): shrub 4 ft.; leaves unifoliate, oblong, villous; flowers solitary, crimson, pedicellate; fruit villous. *Priestleya hirsuta* DC. (No. 1215): shrub 6–7 ft., with lanky stems; branches woolly; leaves simple, sessile, obovate, abruptly pointed; flowers yellow in short dense racemes, the calyx black-tipped.

CUNONIACEAE—*Cunonia capensis* L. f. (No. 1230): tree; leaves pinnate with an odd leaflet; leaflets oblong-ob lanceolate, serrate; flowers white, in dense-spike-like racemes.

PENAEACEAE—*Penaea myrtoides* L. (No. 1208): habit of a shrubby *Veronica*; leaves decussate, ovate-lanceolate; flowers in bracteate short spikes.

¹ Collected at Pacaltzdorp: No. 1232, *Aspalathus ciliaris* Linn. (PAPILIONACEAE); 1233, *Stoebe plumosa* Thunb. (COMPOSITAE); 1234, *Hibiscus Trionum* Linn. (MALVACEAE); 1235, *Erica curviflora* Thunb. (ERICACEAE); 1236, *Satyrium coriifolium* Swartz (ORCHIDACEAE); 1237, *Struthiola ovata* Thunb. (THYMELAEACEAE); 1238, *Helichrysum felinum* Less. (COMPOSITAE); 1239, *Selago spuria* Linn. (SELAGINACEAE); 1240, *Oedera intermedia* DC. (COMPOSITAE); 1241, *Leontonyx squarrosus* DC. (COMPOSITAE); 1242, *Ursinia discolor* N.E. Br. (COMPOSITAE); 1243, *Psoralea tomentosa* Thunb. (PAPILIONACEAE).

PROTEACEAE—**Leucadendron ramosissimum** *Buck.* (No. 1231): 4–6 ft. high; leaves linear-oblancoolate, nearly glabrous; male heads sessile, ovoid, very hairy; female cones with slightly pubescent bracts.

ERICACEAE—**Blaeria ericoides** *Linn.* (No. 1203): 1½ ft.; leaves in whorls of 4, ciliate; flowers white in a terminal cluster surrounded by spatulate ciliate bract-like upper leaves; anthers bipartite, exserted. **Erica cubica** *Linn.* (No. 1205): 1 ft. high; calyx and corolla red; anthers included.

HERBACEAE (HERBACEOUS DICOTYLEDONS)

HALORRHAGACEAE—**Laurembergia repens** *Berg.* (No. 1212): creeping herb in wet places by the roadside; leaves tridentate; flowers very small on slender pedicels.

LOBELIACEAE—**Lobelia hirsuta** *L.* (No. 1202): shrubby and creeping, thinly and shortly setose all over; leaves oblong, rounded at the apex; flowers blue on long pedicels; corolla appressed-setulose.

COMPOSITAE—**Corymbium glabrum** *Linn.* (No. 1222): woolly at the base; leaves sword-shaped, strongly 3-nerved; heads 1-flowered, in lax corymbs. **Mairea crenata** *Nees* (No. 1221): herb with radical oblanceolate dentate leaves and solitary scapigerous flower-heads, the rays white or pink. **Osmites Bellidiastrum** *Thunb.* (No. 1204): hanging from cliffs; shrub, common; leaves narrowly oblanceolate, coarsely toothed only in the upper ½; rays white, disk yellow. **Gnaphalium Dodii** *Lecyns* (No. 1200): much branched and shrubby; leaves obovate, woolly below; flower-heads in sessile glomerules, pale yellow. **H. cymosum** *Less.* (No. 1228): leaves linear, woolly, tips recurved; corymbs of golden heads pedunculate. **H. felinum** *Less.* (No. 1197); **Gamolepis pectinata** *Less.* (No. 1195): shrub; leaves much dissected, glabrous; rays yellow; no pappus, the achenes tuberculate. **Osteospermum corymbosum** *L.* (No. 1196). **Ursinia trifida** *N.E. Br.* (No. 1224): woody, with short spatulate trilobed leaves, and smallish flower-heads.

UMBELLIFERAE—**Hydrocotyle virgata** *L. f.* var. **lanuginosa** (No. 1223): 1 ft. high, much branched and densely woolly; leaves linear.

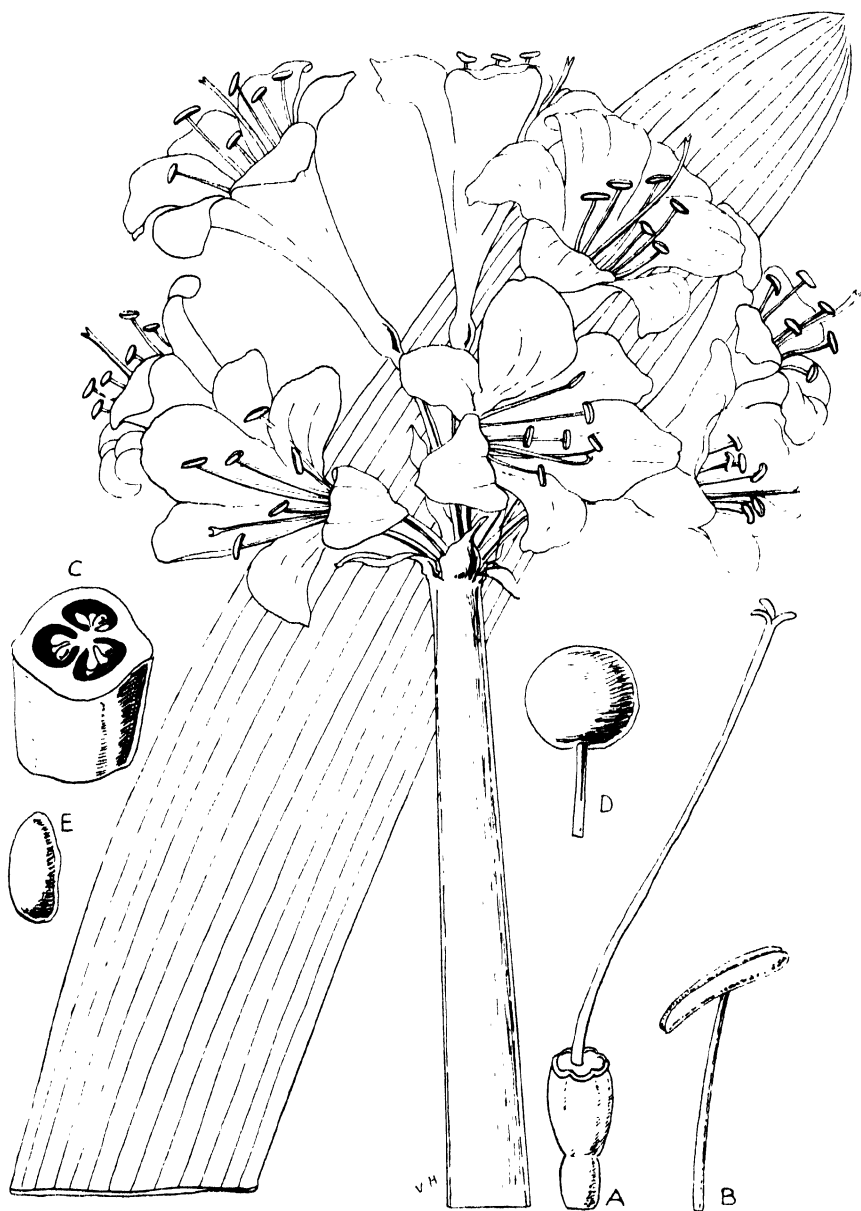
GERANIACEAE—**Pelargonium cordatum** *Ait.* (No. 1198): shrubby, 2 ft. high; leaves ovate-triangular, cordate, softly papillous below; pedicels and calyx softly villous with long hairs; petals deep striped with dark crimson.

MONOCOTYLEDONS

IRIDACEAE—**Aristea thyrsiflora** *N.E. Br.* (No. 1213): 6 ft. high; narrow inflorescences of deep purple-blue flowers. **Geissorhiza graminifolia** *Baker* (No. 1216): white flowers tinged with mauve. **Bobartia aphylla** (*Thunb.*) *Ker* (No. 1217): 2 ft. high, with lemon-yellow flowers and rugose fruits. **Romulea alpina** *L. Bolus* (No. 1220): leaves filiform, flowers crimson, veined outside with purple.

ORCHIDACEAE—**Sehizodium inflexum** *Lindl.* (No. 1210): on wet bank, flowers reddish-carmine, spur obtuse. **Disa sagittalis** *Swartz* (No. 1209): flowers light mauve-white. **Disa uncinata** *Bolus* (No. 1211): slender, 1 ft. high, on wet banks; spur short and contracted at the top. **Satyrium ligulatum** *Lindl.* (Nos. 1207, 1218): 1–1½ ft. high; bracts reflexed; flowers dirty-white, tinged with red. **S. acuminatum** *Lindl.* (No. 1219): flowers white. **Monadenia micrantha** *Lindl.* (No. 1225): leaves linear-lanceolate, reaching the base of the spike, the latter about 12 cm. long, stout. **Disa picta** *Sond.* (No. 1226): leaves linear, broader in the lower half; spike narrow. **Disperis paludosa** *Harv.* (No. 1227): stem-leaves 3–4, narrow; flowers few, with a long ovary.

GRAMINEAE—**Pentameris Thuarli** *Beauv.* var. **Burchellii** *Stapf* (No. 1229): (only one specimen of this at Kew, *Burchell* 6964, from the Langebergen).



Vallota speciosa (Linn. f.) Dur. & Schinz (*V. purpurea* Herb.) (AMARYLLIDACEAE), the George or Knysna "lily"; occurs from George to Humansdorp.

A, pistil; B, stamen; C, cross-section of ovary; D, fruit; E, seed.

Chapter XII

GEORGE TO PORT ELIZABETH

ON Tuesday, 6th November, at 6.15 in the morning we started off again on our trek eastwards, and soon began to botanise at various points under the expert guidance of our kind host, Dr. Fourcade.

At 3 miles east of George we collected the following species :—

Asclepias viridiflora (E. Mey.) (ASCLEPIADACEAE) (No. 1244), with umbels of green flowers on short stems from an erect, narrow tuber; *Lobelia coronopifolia* L. (LOBELIACEAE) (No. 1245), softly pubescent and woody, with long peduncles and pinnatifid leaves; *Themeda triandra* Forssk. var. *mollicoma* Stapf (GRAMINEAE) (No. 1246), and growing with it, and very similar to it, *Tristachya hispida* K. Schum. (GRAMINEAE) (No. 1245a); two other grasses, *Pentaschistus heptamera* Stapf (No. 1247); and *Setaria flabellata* Stapf (No. 1248); *Gnulia nodiflora* Meisn. (THYMELAEACEAE) (No. 1249), with heads of silky flowers.

At 4 miles from George¹ some striking plants were gathered: *Polygala virgata* Thunb. (POLYGALACEAE) (No. 1250), with strict branches, shortly linear leaves, and racemes of largish beautiful pink flowers. A pretty little "Pink" very like that from the 'heddar Gorge in England, was *Dianthus crenatus* Thunb. (CARYOPHYLLACEAE) (No. 1254). A small tree I was eager to see growing wild was our No. 1256, *Burchellia bubalina* Sm., called *B. capensis* in the *Flora Capensis*; flowers red tubular. A tiny-leaved *Sutera* proved to be *S. phlogiflora* Hiern (No. 1258).

At 8 miles east of George,² mostly in the forest, we added some interesting species to our presses, including further material of *Kiggelaria africana* L. (FLACOURTIACEAE) (No. 1261), figured and commented on on p. 201. A striking Gentianaceous plant straggling over low bushes was *Chironia melampyrifolia* Lam. (No. 1264), with sessile subcordate lanceolate leaves and large pink flowers (see figure, p. 127). A shrubby *Pelargonium* with ovate cordate softly villous leaves and bright carmine flowers proved to be *P. cordatum* Ait. (No. 1265). The family BRUNIACEAE was represented by *Berzelia lanuginosa* Brogn. (No. 1266), with small ericoid leaves and small balls of pale-cream flowers, and a dainty *Podalyria*, *P. glauca* DC. (PAPILIONACEAE) (No. 1267), with deep-crimson solitary flowers, green here and there.

At 10 miles from George³ one of our most interesting finds was

¹ Also collected here: No. 1251, *Eragrostis curvula* Nees (GRAMINEAE); 1252, *Setaria flabellata* Stapf; 1255, *Indigofera depressa* Harv. (PAPILIONACEAE); 1257, *Aspalathus asparagoides* L. f. (PAPILIONACEAE); 1259, *Chaetacanthus setiger* (Pers.) Lindau (ACANTHACEAE).

² Also collected: No. 1260, *Solanum pseudocapsicum* L. (SOLANACEAE); 1262, *Lobelia Erinus* L. var. *bellidifolia* (LOBELIACEAE); 1263, *Crassula rosularis* Harv. (CRASSULACEAE).

³ Also collected: No. 1269, *Satyrium acuminatum* Lindl. (ORCHIDACEAE); 1270, *Ceratandra grandiflora* Lindl. (ORCHIDACEAE); 1271, *Erica cerinthoides* Linn. (ERICACEAE); 1271, *Lightfootia fasciculata* C.DC. (CAMPANULACEAE); 1273, *Erica glandulosa* Thunb. (ERICACEAE); 1275, *Malvastrum angustifolium* Stapf (MALVACEAE).

Knowltonia filia Dur. & Schinz (RANUNCULACEAE) (No. 1268), with much-divided leaves (see comments on this genus on p. 37). Here we gathered a plant strange to me at the time and of great phytogeographical interest—i.e., *Caesia contorta* (L.) Dur. & Schinz (LILIACEAE) (No. 1278). The genus occurs in South Africa, Madagascar, Australia, and Tasmania, and is a very natural one (see map, p. 218).

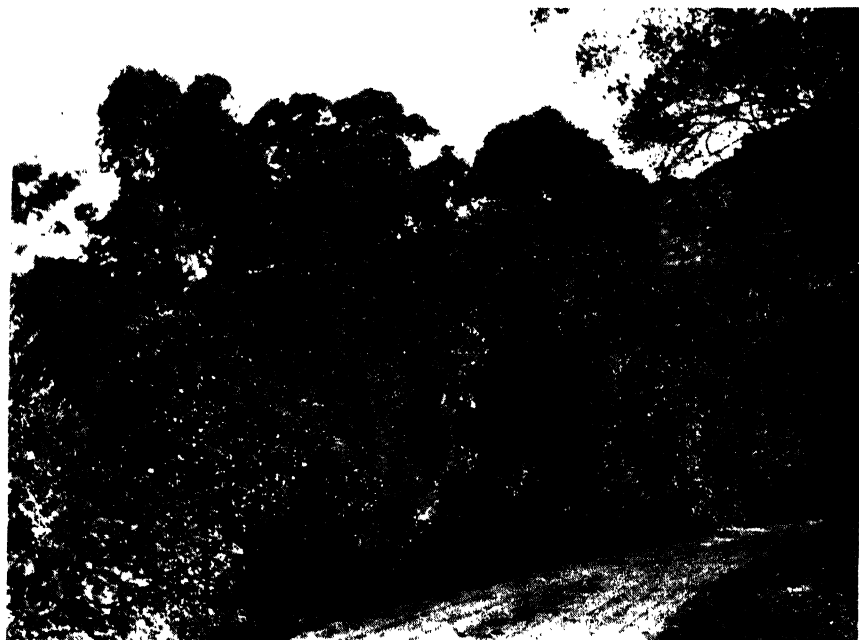
At Touws River, 12 miles east of George, mostly in the forest, we collected, among other plants, a specimen of a most interesting genus belonging to the family HAMAMELIDACEAE. South Africans who have



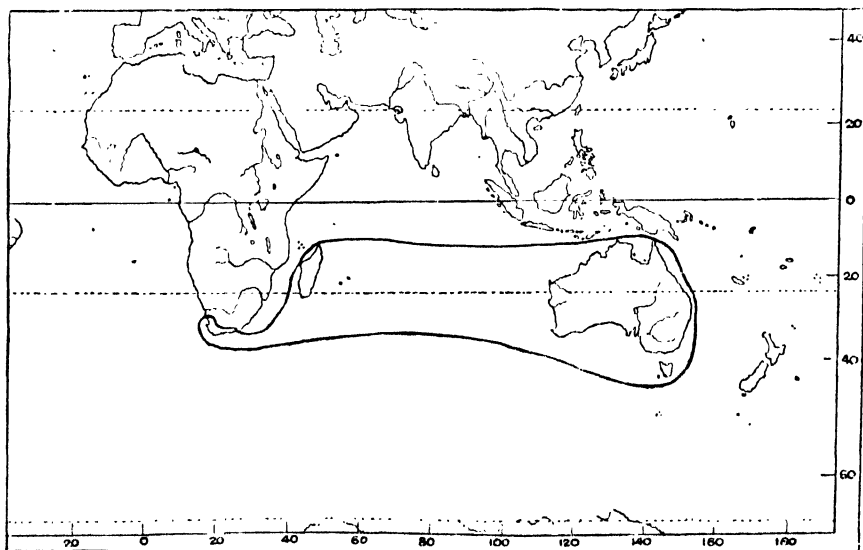
Chironia melampyrifolia Lam. (GENTIANACEAE), a climber.

A, corolla with stamens; B, anther; C, calyx and pistil.

visited Kew towards the close of winter or in very early spring will perhaps remember having seen the Witch-hazels in flower, shrubs or small trees leafless at the time of the appearance of their weird spider-like pale-yellow sweet-scented flowers. The plant we collected is *Trichocladus crinitus* Pers. (No. 1281), one of the three species known from South Africa (see fig., p. 303). It is found in the forests of George, Knysna, Uitenhage and Natal. A second species, *T. ellipticus* Eckl. & Zeyh., begins in the forests of Uitenhage and terminates in those of Natal, and a third and rather large-flowered species, *T. grandiflorus* Oliv., in the forests of Lydenburg and Barberton districts in the Eastern Transvaal. The last mentioned is the most primitive species, the flowers being *spicate*, all the others, including those from Tropical



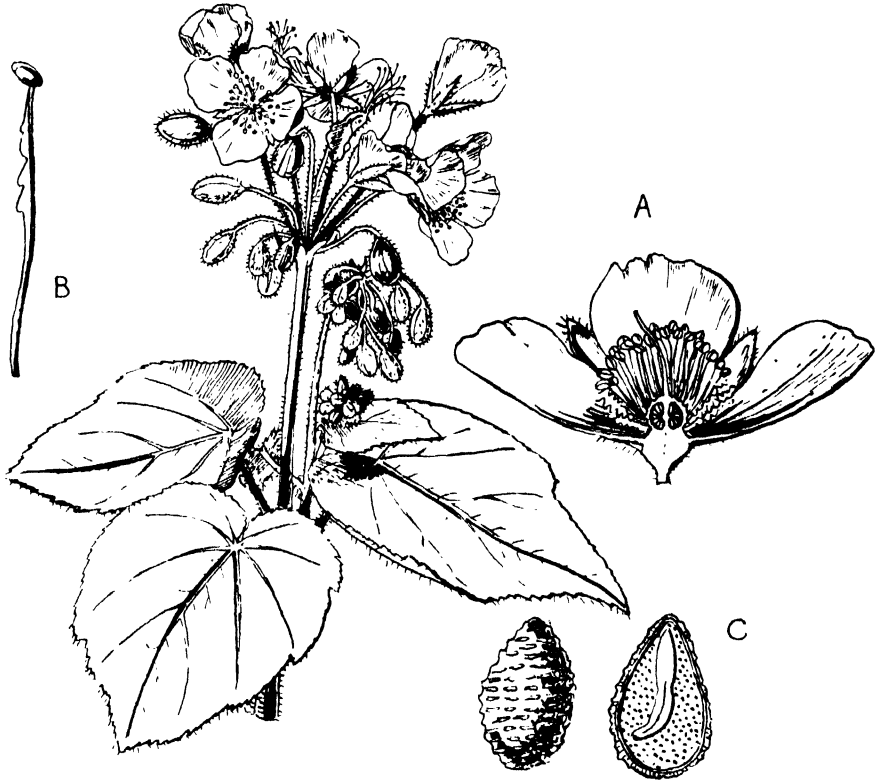
The road through the Zitzikama Forest.



Range of the natural genus *Cacia* (LILIACEAE).

Africa, having a capitate inflorescence. Two species occur in the mountains of Tanganyika Territory (*T. Goetzei* Engl. and *T. dentatus* Hutch.), and a third (*T. malosanus* Baker) is widely spread from Nyasaland, Northern Rhodesia and Katanga as far north as Harar in Abyssinia.

The main centres of distribution of HAMAMELIDACEAE are Eastern Asia and the Eastern United States of America, a few genera extending into the northern tropics. With the exception of *Trichocladus*, two small genera in the Mascarene Islands, and a little-known genus, *Ostrearia*



Sparmannia africana Linn. (TILIACEAE).

A, vertical section of flower; B, stamen; C, seed.

Baill., in North-eastern Queensland, the family is confined to the Northern Hemisphere. Its presence in the Southern Hemisphere, therefore, is probably due to migration from the north by way of the more temperate mountain ranges of Eastern Africa. In relation to the general distribution of the family, *Trichocladus* thus recalls that of *Berberis* and *Cornaceae*, newer types which have penetrated only as far south as the mountains of Tanganyika. It should be remembered that these same mountains have also provided the means for the northward spread of families which have originated in the Southern Hemisphere, such as PROTEACEAE, which are found as far north as Abyssinia.

In the phylogenetic table of South African families, the HAMAMELIDACEAE are shown to have arisen out of the *Rosales* stock, being something of a half-way house between them and the catkin-bearing families such as the nut-bushes (CORYLACEAE) and the Birches (BETULACEAE), widely spread in the Northern Hemisphere. This has recently received support from cytological researches.¹



Gerbera serrata (Thunb.) Druce (COMPOSITAE); ray-flowers white above, deep red below.

Other plants collected at Touws River were *Carex aethiopica* Schkuhr. (CYPERACEAE) (No. 1279), *Plectranthus fruticosus* L'Herit. (LABIATAE) (No. 1279a); *Leidesia procumbens* (L.) Prain (EUPHORBIACEAE) (No. 1280); *Stachys Thunbergii* Benth. (LABIATAE) (No. 1283); *Lobelia aspera* Spreng. (LOBELIACEAE) (No. 1284); *Ehrharta erecta* Lam.

¹ See Anderson and Sax, "Chromosomes in Hamamelidaceae" (*Journ. Arn. Arboretum*, 16: 212 (1935)).

(GRAMINEAE) (No. 1285); *Satyrium rupestre* Schltr. (ORCHIDACEAE) (No. 1285a); *S. acuminatum* Lindl. (No. 1285b).

Near Hoogekraal River, about 23 miles east from George,¹ in the open veld the most striking herb was *Gerbera serrata* (Thunb.) Druce² (COMPOSITAE) (No. 1289), with petiolate radical oblong leaves repand-dentate on the margin and woolly below, the lower side of the ray-flowers a deep red, white above (see figure, p. 220).

At 30 miles we paused to gather *Polygala oppositifolia* L. (No. 1301) and an orchid, *Disa sagittalis* Swartz (No. 1302), with white flowers, the lip with carmine midrib, plentiful and forming almost a carpet near the river.

At 32 miles east from George³ the most conspicuous plant in the open veld was *Watsonia angusta* Ker (IRIDACEAE) (No. 1295a), about 3½ ft. high, with lax spikes of curved red flowers 6–7 cm. long. A slender very glandular *Geranium* was *G. ornithopodium* E. & Z. (No. 1297), with small mauve flowers.

A Thymelaeaceous plant with reddish-brown flowers was *Passerina filiformis* L. (No. 1298), in company with an inconspicuous *Psoralea*, *P. polyphylla* E. & Z. (PAPILIONACEAE) (No. 1299), and a woody virgate species of *Hydrocotyle*, *H. virgata* L. f. (No. 1300), with linear leaves, very different from the genus as we are accustomed to see it in the Northern Hemisphere.

At Phantom Pass⁴ (37 miles east of George) three COMPOSITAE were in flower: *Euryops virgineus* Less. (No. 1303), a shrub up to 12 ft., with small imbricate trifid leaves and small flower-heads with yellow rays; *Relbunium trinervis* Thunb. (No. 1304), with lanceolate entire 3-nerved leaves and sessile yellow heads; and *Helichrysum nudifolium* Less. (No. 1305), with Plantago-like leaves and close corymbs of golden-yellow heads.

A few plants were gathered near Knysna⁵ and at Belvedere,⁶ opposite Knysna, on 7th November. Among these were my own species of *Leucadendron*, *L. Phillipsii* Hutch. (No. 1314), a common shrub with glabrous linear leaves and broad-based outer bracts, the female floral bracts tomentose outside; and *Pelargonium hirsutum* Ait. (No. 1317), with a branched tuber-like rootstock, oblanceolate

¹ Also collected: No. 1286, *Ceratandra grandiflora* Lindl. (ORCHIDACEAE); 1287, *Erica leucopelta* Tausch (ERICACEAE); 1288, *Metalsia muricata* Less. (COMPOSITAE); 1290, *Muraltia stipulacea* Harv. (POLYGALACEAE).

² The *G. ferruginea* DC. of *Flora Capensis*, but founded on *Arnica serrata* Thunb.

³ No. 1291, *Agathosma microphylla* G. F. W. Meyer (RUTACEAE); found only in this region; 1292, *Polygala hispida* Burch. (POLYGALACEAE); 1293, *Rhynchosia capensis* (Burm.) Schinz (syn. *R. glandulosa* DC.); 1294, *Indigofera stricta* L. f.; 1295, *Indigofera porrecta* E. & Z.; 1296, *Hallia cordata* Thunb. (PAPILIONACEAE).

⁴ Also collected at Phantom Pass: No. 1306, *Aspalathus canescens* L. (PAPILIONACEAE); 1307, *Muraltia ciliaris* DC. (POLYGALACEAE); 1308, *Phylla imberbis* Berg. (RHAMNACEAE).

⁵ Near Knysna: 1309, *Carex aethiopica* Schkuhr. (CYPERACEAE); 1310, *Disa bivalvata* (L. f.) Dur. & Schinz (ORCHIDACEAE); and numbered later, 1369, *Pachycarpus dealbatus* E. Mey. (ASCLEPIADACEAE), and 1370, *Falkia repens* L. f. (CONVOLVULACEAE).

⁶ 1311, *Royena Simii* O. Ktze. (EBENACEAE); 1312, *Pterocelastrus tricuspidatus* Sond. (CELASTRACEAE); 1313, *Grewia occidentalis* L. (TILIACEAE); 1315, *Ursinia scariosa* Poir. (COMPOSITAE); 1318, *Aspalathus thymifolia* Linn. var. *albiflora* Harv. (PAPILIONACEAE).

setose-pilose leaves, and umbels of small white flowers. Three grasses were in flower : *Harpechloa falx* (L. f.) O. Kuntze (No. 1319), with secund dark olive-grey spikes on woolly peduncles; *Eragrostis chloromelas* Steud. (No. 1320), a perennial with secund growth of the basal shoots, and narrow panicles of dark olive-grey spikelets; and *Heteropogon contortus* R. & S. (No. 1321), with pilose leaves and long, twisted awns.

From Knysna we visited the forestry station at Deepwalls, in charge of Mr. Laughton, about 22 miles from the town. It is in the middle of this interesting forest, at an altitude of 1720 ft., and I was very glad to see the giant specimen of *Podocarpus falcata*, 127 ft. high, 63 ft. to the first branch, and over 21 ft. in girth 6 ft. from the base. It is computed to be at least 1500 years old. Other interesting trees were *Platylophus trifolius* (growing in wet situations), ironwood, *Olea laurifolia*, *Apodytes dimidiata*, *Podocarpus latifolia*, the stinkwood, *Ocotea bullata*, *Curtisia faginea* (CORNACEAE), *Halleria lucida* (a Scrophulariaceous tree), and *Gonioma Kamassi* E. Mey. (APOCYNACEAE), the "Kamassi" Wood, 45 ft. high, 2 ft. in girth, *Elaeodendron Kraussianum* Sim. (50 ft. high), and the tree fern, *Hemitelia capensis*. I was interested to see a remote station of this kind, with a good herbarium and library, Mr. Laughton being keenly interested in botany. He has published an important paper on the forest.¹

That day we were also able to see a timber yard at Knysna and showrooms full of beautiful "Stinkwood" furniture.

In the afternoon we were hospitably entertained by Miss Duthie's² family at Belyedere, and collections noted above were made on the hills above the farm and near the railway.

Here at Knysna we were in the midst of the interesting southern forest region of the Cape, which stretches from the neighbourhood of George to Humansdorp. Our host, Dr. Fourcade, has made a thorough investigation of the flora of this region and possesses an admirably arranged herbarium of local plants, duplicates of which are in the Bolus Herbarium and at Kew. His account of the flora is a valuable contribution to South African botany (see p. 607).

The Forest Ecology of this region has been the subject of a comprehensive and very interesting paper by J. F. V. Phillips,³ comprising Memoir No. 14 of the Records of the Botanical Survey. Its title is "Forest Succession and Ecology in the Knysna Region"; it occupies 327 pages, with 30 diagrams and 82 photographs, and was published in 1931. Every student should study this paper closely, as it is full of original observations.

This southern forest, remnants of which are found as far west as the Cape Peninsula, is an extension of the forest which clothes the lower part of the escarpment of the Drakensberg and stretches away north-

¹ F. S. Laughton, "The Sylviculture of the Indigenous Forests of the Union of South Africa with special reference to the Forests of the Knysna Region" (*Science Bulletin* 157, Dept. of Agric. and Forestry, pp. 168 (1937)).

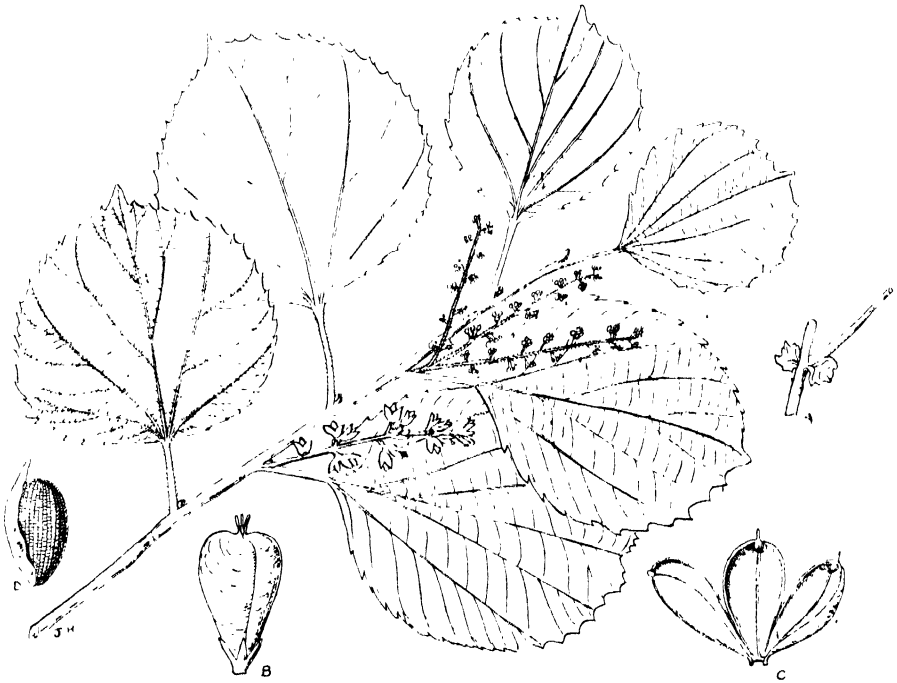
² Miss Duthie, lecturer in botany at Stellenbosch, and cousin of Mr. J. F. Duthie, whom the author of this book succeeded as Assistant for India at Kew.

³ John F. V. Phillips, D.Sc., Edinb., formerly in charge of the Forest Research Station, Deepwalls, Knysna, later of the Tetzse Research Investigations, Tanganyika Territory, and now Professor of Botany, University of the Witwatersrand, Johannesburg.

wards through the eastern Transvaal into eastern Rhodesia. Outliers of it occur at Woodbush, in the Pietersburg district of the Transvaal, and an arm of it juts out westwards across the upper southern slopes of the Zoutpansberg, in the northern Transvaal.

The principal trees and shrubs of this southern forest are enumerated in the table commencing on p. 224, and arranged after my own phylogenetic system, with notes on their geographical distribution. The list of species is taken from Phillips' paper, with a few emendations in the nomenclature.

If this list be considered carefully it will be seen that many of the genera represented occur also in tropical Africa. Some do not,



Trimeria grandifolia (Hochst.) Warb. (FLACOURTIACEAE).

A, stipules; B, fruit; C, shell of fruit; D, seed.

however, and their presence as important constituents of the forest seems to indicate a mixture of boreal (*Tropical African*) and austral types. These austral types are *Lachnostylis* (EUPHORBIACEAE), *Cunonia* (see map, p. 213) and *Platylophus* (CUNONIACEAE), *Virgilia* (PAPILIONACEAE), *Calodendrum* (RUTACEAE), *Curtisia* (CORNACEAE), *Gonioma* (APOCYNACEAE), *Brachylaena* and *Tarchonanthus* (COMPOSITAE), and *Halleria* (SCROPHULARIACEAE). It seems probable that these genera, and others which may once have existed, constituted an original forest in very far-off bygone times, and that the remainder have come in from the great forests of eastern tropical Africa along the lower escarpment of the Drakensberg. Conversely, several of the species belonging to these austral genera are distributed northwards for some distance into East Africa.

Geographical Range of Principal Trees and Shrubs in the Knysna Forest

Family.	Species.	Distribution in South Africa.	Further Distribution.
TAXACEAE . . .	<i>Podocarpus latifolius</i> R. Br.	Table Mt. through the coastal forests to Swaziland and the eastern Transvaal.	—
„ . . .	<i>P. falcatus</i> R. Br.	Swellendam through the coastal forests to Portugese East Africa and the northern Transvaal.	—
CUPRESSACEAE . . .	<i>Widdringtonia cupressoides</i> Endl.	Cape and Worcester to King-Williams-town.	—
LAURACEAE . . .	<i>Ocotea bullata</i> E. Mey.	Swellendam to Humansdorp.	—
EBENACEAE . . .	<i>Royena lucida</i> L.	Widely distributed.	—
„ . . .	<i>Euclea lanceolata</i> E. Mey.	Through the Central Karoo to Natal and Transvaal.	—
PAPILIONACEAE . . .	<i>Virgilia oroboides</i> (Berg.) Salt.	Cape Div. to Humansdorp.	—
CUNONIACEAE . . .	<i>Platylophus trifolius</i> Don.	Paarl to Humansdorp.	—
„ . . .	<i>Canonia capensis</i> .	Table Mt. to Natal.	—
HAMAMELIDACEAE . . .	<i>Trichocladus crinitus</i> Pers.	Forests of George to Uitenhage and Natal.	—
„ . . .	<i>T. ellipticus</i> E. & Z.	To Uitenhage and Natal.	—
ULMACEAE . . .	<i>Celtis rhamnifolia</i> Presl.	Eastwards to Natal and Transvaal.	Through Tropical Africa to Arabia.
MORACEAE . . .	<i>Ficus capensis</i> Thunb.	Knysna eastwards to Natal and Transvaal.	Tropical Africa generally.
FLACOURTIACEAE . . .	<i>Dorvalis rhamnoides</i> Burch.	George to Natal and Transvaal.	—
„ . . .	<i>Kiggelaria africana</i> L.	Clanwilliam and Namaqualand, Cape to Natal and Transvaal.	North to Tanganyika Territory.
„ . . .	<i>Scolopia Mundtii</i> Arn.	In Vanstaadens Mts. and north to Natal.	—
„ . . .	<i>S. Zeyheri</i> Syzl.	—	—
„ . . .	<i>Trimeria grandifolia</i> (Hochst.) Warb.	South-eastwards to Natal and Transvaal.	—
PROTEACEAE . . .	<i>Faurea MacNaughtonii</i> Phillips.	Knysna, Pondoland, Natal.	—
PITTOSPORACEAE . . .	<i>Pittosporum viridiflorum</i> Sims.	From George through the eastern forests to Natal, Basutoland and the Transvaal.	Eastern Rhodesia and Angola.
TILIACEAE . . .	<i>Sparrmania africana</i> Linn. f.	George to Humansdorp and Clarkson.	—
EUPHORBIACEAE . . .	<i>Lachnostylis capensis</i> Turcz.	Swellendam to Port Elizabeth.	—

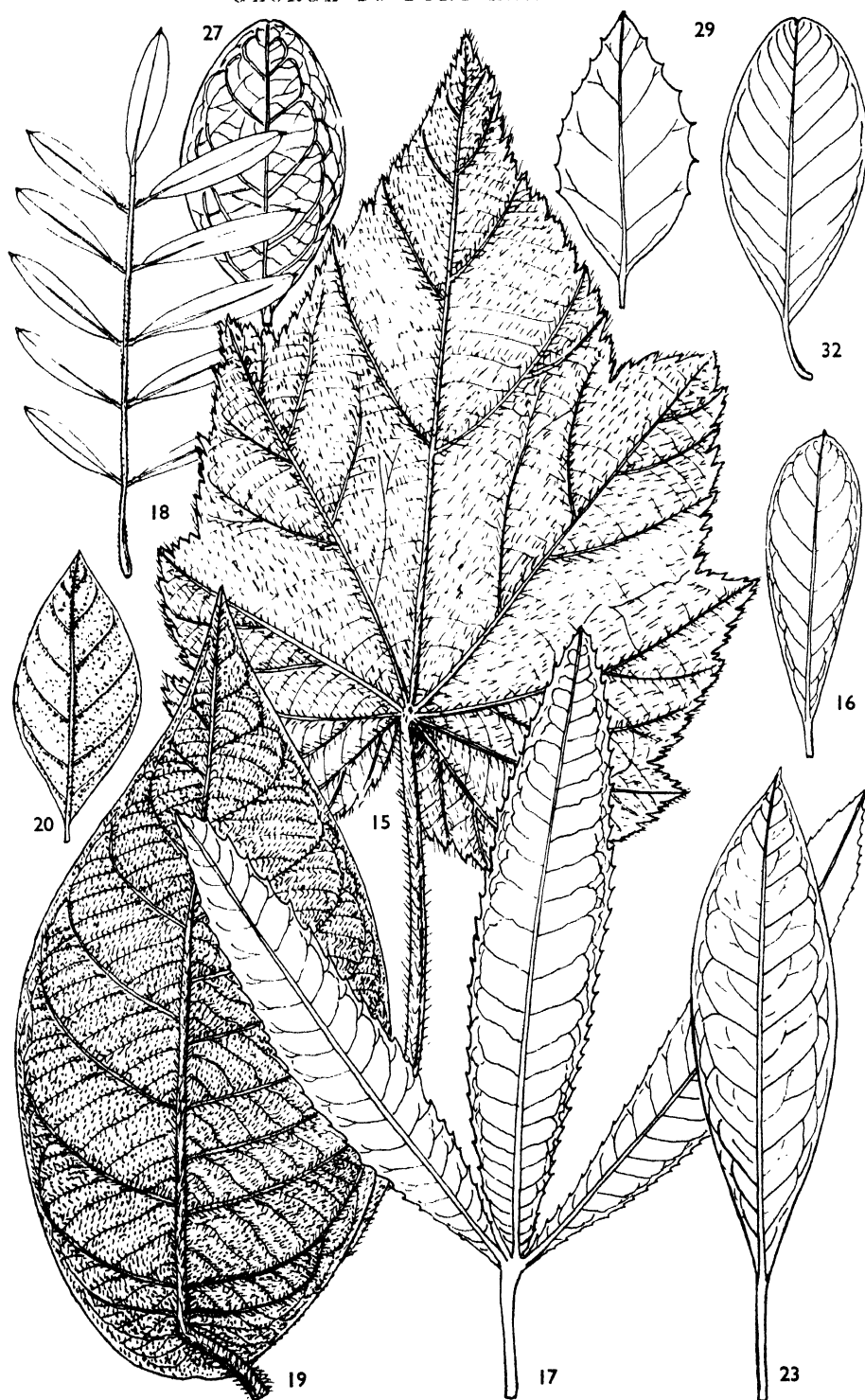
TABLE—(continued)

Family.	Species.	Distribution in South Africa.	Further Distribution.
OCHNACEAE .	<i>Ochna arborea</i> Burch.	George to Delagoa Bay.	—
„ .	<i>O. atropurpurea</i> DC.	Caledon to Eastern Transvaal.	—
OLINIACEAE .	<i>Olinia cymosa</i> Thunb.	General from Cape and Paarl to Albany.	—
AQUIFOLIACEAE .	<i>Ilex mitis</i> Radlk.	South Africa generally.	Angola Madagascar, East Africa to Red Sea and on Cameroons Mt.
CELASTRACEAE .	<i>Gymnosporia acuminata</i> (Linn.) Szysz.	Cape Div. through South-East to Eastern Transvaal.	—
„ .	<i>G. peduncularis</i> (Sond.) L. Bolus.	George to Natal.	—
„ .	<i>G. buzifolia</i> (Linn.) Szysz.	South Africa generally.	Rhodesia and East Africa.
„ .	<i>Cassine Kraussianum</i> (Sim.) Bernh.	George to Natal.	—
„ .	<i>Pterocelastrus variabilis</i> Sond.	Cape to Natal and North Transvaal.	—
ICACINACEAE .	<i>Cassinopsis ilicifolius</i> (Hochst.) O. Kuntze.	To Northern Transvaal and Natal.	—
„ .	<i>Apodytes dimidiata</i> E. Mey.	Swellendam through eastern districts.	To Abyssinia, and in Rhodesia and Angola.
RHAMNACEAE .	<i>Rhamnus prinoides</i> L'Hérit.	Swellendam to Natal and Transvaal.	Through East Africa to Abyssinia, in Rhodesia and Bamenda (Cameroons).
„ .	<i>Scutia myrtina</i> (Burin.) Kurz.	General in South Africa.	Widely distributed in Tropical Africa to India and Mascarene Islands.
MYRSINACEAE .	<i>Rapanea melanophloeos</i> (R. Br.) Mez.	Paarl and Caledon to Natal and in Somerset East.	—
CORNACEAE .	<i>Curtisia faginea</i> Ait.	Cape to Northern Transvaal and Natal.	E. Rhodesia.
RUTACEAE .	<i>Calodendrum capensis</i> Thunb.	Cape to Natal.	Through Eastern Rhodesia to Kenya.
„ .	<i>Fagara Davyi</i> Verdoorn.	To Natal.	—
„ .	<i>Vepris lanceolata</i> (Lam.) G. Don.	From Knysna to the Kalahari and Portuguese East Africa.	Mauritius and Reunion.
MELIACEAE .	<i>Ekebergia capensis</i> Sparrm.	George to Uitenhage.	—
ANACARDIACEAE .	<i>Rhus Legatii</i> Schönl.	Coast districts from Swellendam to Natal and northern Transvaal.	—
LOGANIACEAE .	<i>Chilianthus arboreus</i> A. DC.	Widely distributed.	—

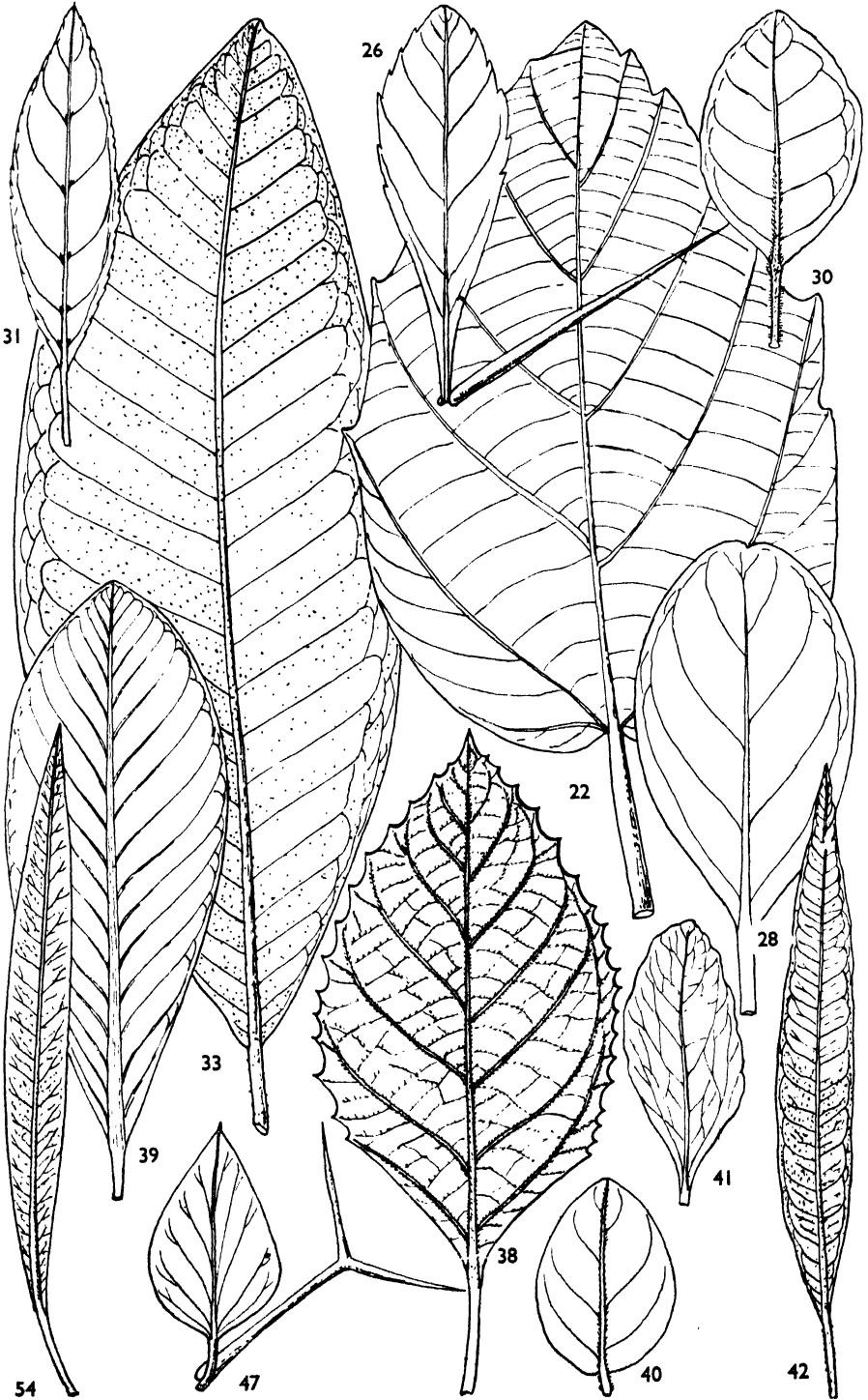
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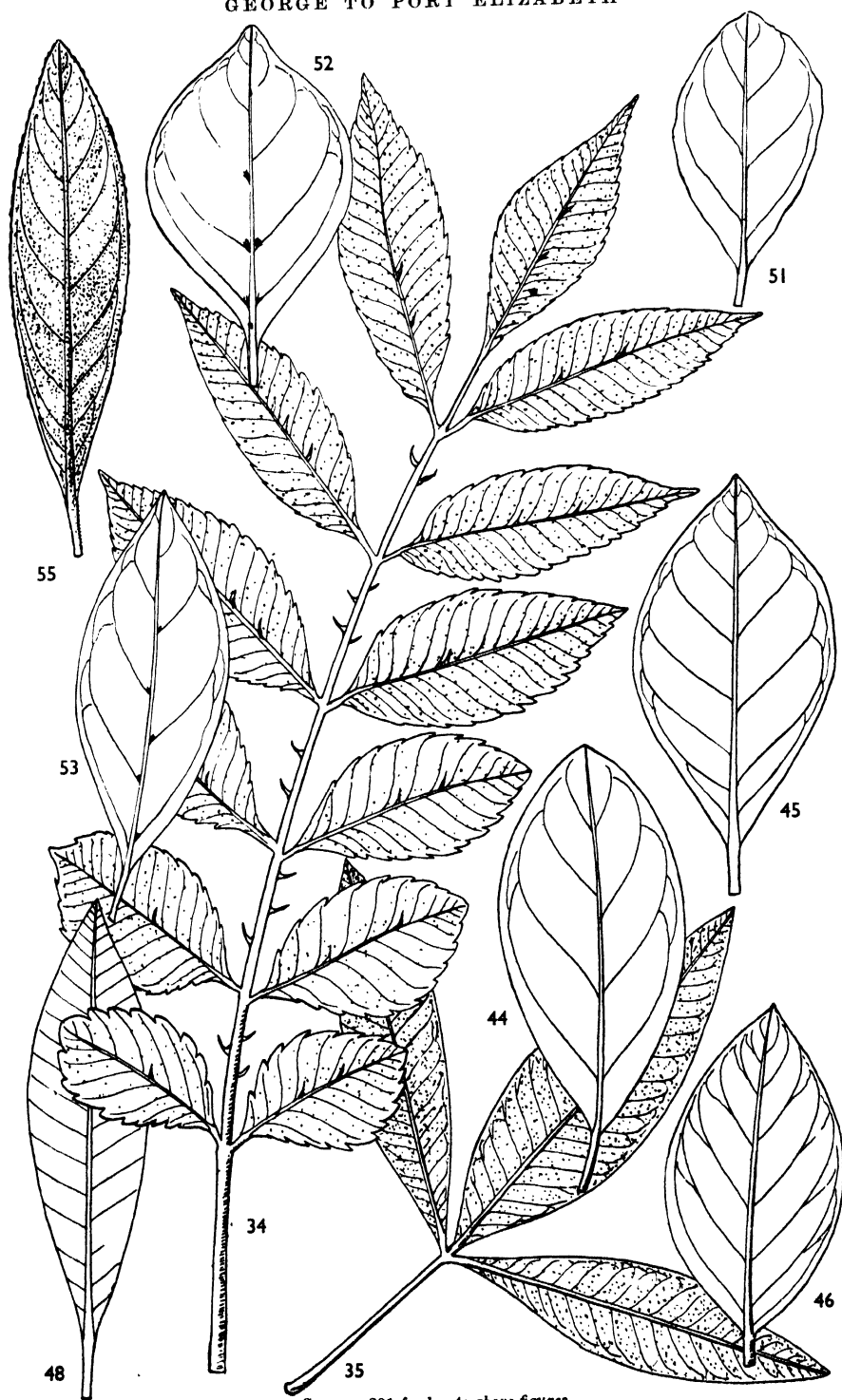
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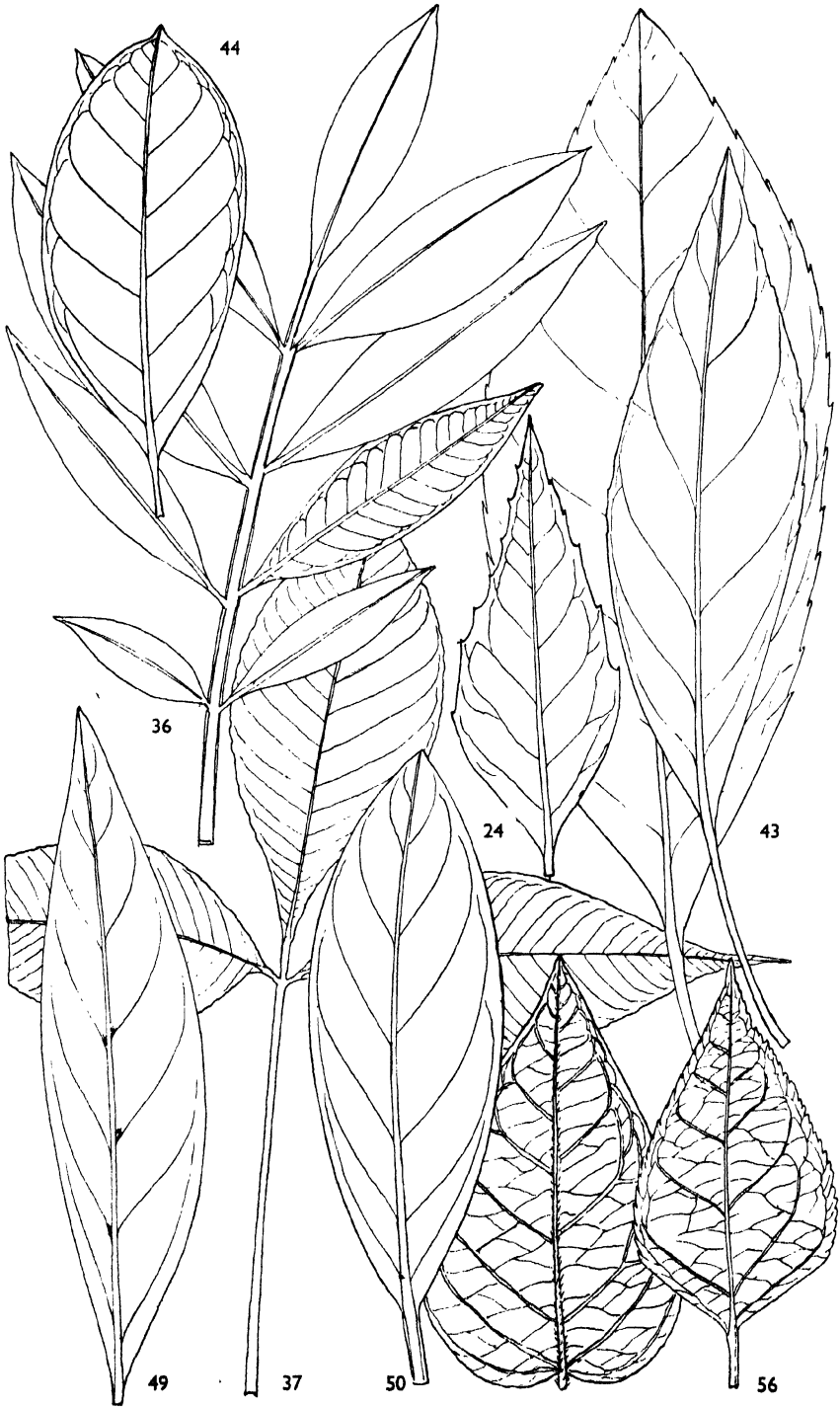
See page 231 for key to above figures.



See page 231 for key to above figures.



See page 231 for key to above figures.



See page 231 for key to above figures.

TABLE—(continued)

Family.	Species.	Distribution in South Africa.	Further Distribution.
LOGANIACEAE	<i>Nuxia floribunda</i> Benth.	George to Natal and Zululand.	---
OLEACEAE	<i>Olea capensis</i> Linn.	Cape Div. to Albany.	---
"	<i>O. laurifolia</i> Lam.	Cape Div. to Natal.	---
APOCYNACEAE	<i>Acokanthera venenata</i> G. Don.	Mossel Bay eastwards to Queens-town and Natal.	East Tropical Africa.
"	<i>Carissa arduina</i> Lam.	Bredasdorp and Swellendam to Bathurst and to Natal.	Rhodesia and Central Africa.
"	<i>Gonioma Kamassi</i> E. Mey.	George to East London.	---
RUBIACEAE	<i>Gardenia Rothmannia</i> Linn.	Swellendam to Natal	---
"	<i>Burchellia bubalina</i> (Linn. f.) Sims.	George to Natal and Transvaal.	---
"	<i>Canthium obovatum</i> Klotzsch.	East to Natal and Transvaal.	---
"	<i>C. Mundtianum</i> Cham. & Schlecht.	Cape to Portuguese East Africa.	---
"	<i>C. ventosum</i> (Linn.) S. Moore.	Cape to Natal and Transvaal.	---
COMPOSITAE	<i>Brachylaena neriifolia</i> R. Br.	South-West Cape to Zitzikamma.	---
"	<i>Tarchonanthus camphoratus</i> Linn.	Widely spread.	North-eastwards to Red Sea.
SCROPHULARIACEAE	<i>Halleria lucida</i> Linn.	Clanwilliam and Worcester to Natal.	East Tropical Africa to Abyssinia; South Angola, North-west Rhodesia.

KEY TO FIGURES (Pages 226-230).

Trees and shrubs of the Knysna Forest: 1. *Podocarpus latifolius* R. Br. 2. *Podocarpus falcatus* R. Br. 3. *Widdringtonia cupressoides* Endl. 4. *Ocotea bullata* E. Mey. 5. *Olinia cymosa* Thunb. 6. *Faurea MacNaughtonii* Phillips. 7. *Pittosporum viridiflorum* Sims. 8. *Dovyalis rhamnioides* Burch. 9. *Kiggelaria africana* Linn. 10. *Scolopia Mundtii* Arn. 11. *Scolopia Zeyheri* Syzl. 12. *Trimeria grandifolia* (Hochst.) Warb. 13. *Ochna arborea* Burch. 14. *Ochna atropurpurea* DC. 15. *Sparrmania africana* Linn. f. 16. *Lachnopylis capensis* Turcz. 17. *Platylophus trifoliatus* Don. 18. *Virgilia capensis* Lam. 19. *Trichocladus crinitus* Pers. 20. *Trichocladus ellipticus* Eckl. & Zeyh. 21. *Celtis rhamnifolia* Presl. 22. *Ficus capensis* Thunb. 23. *Ilex mitis* Radlk. 24. *Gymnosporia acuminata* (Linn.) Szysz. 25. *Gymnosporia peduncularis* (Sond.) L. Bolus. 26. *Gymnosporia buxifolia* (Linn.) Loes. 27. *Cassine Kraussianum* (Sim). 28. *Pterocelastrus variabilis* Sond. 29. *Cassinopsis ilicifolia* (Hochst.) O. Kuntze. 30. *Apodytes dimidiata* E. Mey. 31. *Rhamnus prinoides* L'Hérit. 32. *Scutia myrtina* (Burm.) Kurz. 33. *Calodendrum capensis* Thunb. 34. *Fagara Davyi* Verdoorn. 35. *Vepris lanceolata* (Lam.) G. Don. 36. *Ekebergia capensis* Sparrm. 37. *Rhus laevigata* Linn. 38. *Curtisia faginea* Ait. 39. *Rapanea melanophloeos* (R. Br.) Mez. 40. *Royena lucida* Linn. 41. *Euclea lanceolata* E. Mey. 42. *Chilianthus arboreus* A. DC. 43. *Nuxia floribunda* Benth. 44. *Olea capensis* Linn. 45. *Olea laurifolia* Lam. 46. *Acokanthera venenata* G. Don. 47. *Carissa arduina* Lam. 48. *Gonioma Kamassi* E. Mey. 49. *Gardenia Rothmannia* Linn. 50. *Burchellia bubalina* (Linn. f.) Sims. 51. *Canthium obovatum* Klotzsch. 52. *Canthium Mundtianum* Cham. & Schlecht. 53. *Canthium ventosum* (Linn.) S. Moore. 54. *Brachylaena neriifolia* R. Br. 55. *Tarchonanthus camphoratus* Linn. 56. *Halleria lucida* Linn.

R. A. Dyer has recently described a very interesting tree which was first collected by Mr. F. S. Laughton in 1933 above Baviaans Kloof River, and the next year by Mr. A. D. Mitchell, District Forest Officer, near the road below Longmore Settlement, near Port Elizabeth. It has also been found in the Zuurberg. It is a small tree about 20 ft. high, belongs to SAPINDACEAE, and has been assigned to *Atalaya* (*A. capensis* R. A. Dyer), a genus previously known only from Australia and Timor. As Dyer remarks, the discovery of a tree belonging to an



Ilex mitis Radlk. (AQUIFOLIACEAE), widely spread into Tropical Africa and in Madagascar.

A, male flower and buds; B, anther; C, female flower; D, cross-section of ovary; E, fruit.

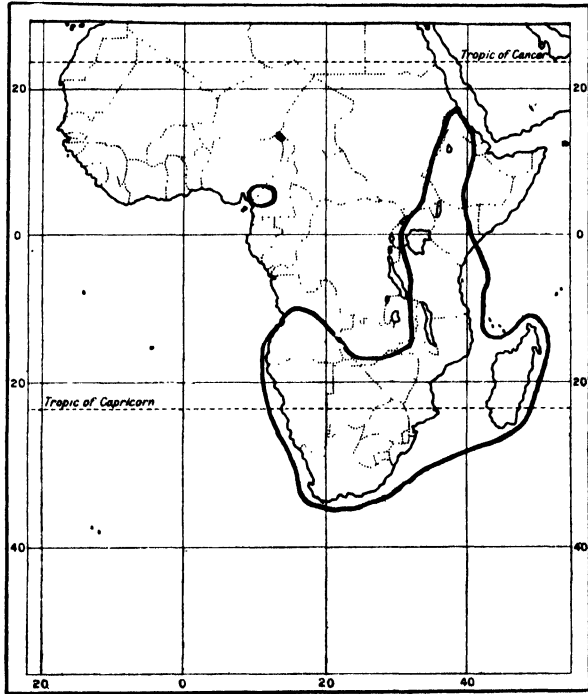
Australian genus is very remarkable, and adds one more link between the two floras.

On 8th November we left Witte Els Bosch and resumed our trek to the eastwards, botanising in open veld at 3 miles: *Aspalathus spinosa* L. (PAPILIONACEAE) (No. 1322); *Erica formosa* Thunb. (ERICACEAE) (No. 1323); *Crassula acutifolia* Linn. var. *densifolia* Schönl. (No. 1324); *Erica sessiliflora* L. f. (No. 1325); *Bobartia aphylla* (IRIDACEAE) (No. 1326); *Bartholina Ethelae* Bolus (ORCHIDACEAE) (No. 1327); *Holothrix squamulosa* Lindl. (ORCHIDACEAE) (No. 1328).

At 7 miles, in the forest: *Aristea ensifolia* Muir (IRIDACEAE) (No. 1329); *Diets vegeta* N.E. Br. (IRIDACEAE) (No. 1330).

At 11 miles, in the open veld: *Erica curviflora* Thunb. (No. 1331),

4 ft.; flowers dull red; *Polygala latifolia* L. (No. 1332), shrub, leaves cordate-ovate, flowers light purple, with white crest; *Phytica hirsuta* Thunb. (RHAMNACEAE) (No. 1333), 5 ft. shrub; flowers greyish-white; *Chironia tetragona* L. f. var. *linearis* (GENTIANACEAE) (No. 1334), erect; flowers deep pink, brownish outside; *Malvastrum angustifolium* Stapf (MALVACEAE) (No. 1335), shrub 4 ft.; leaves narrow, serrate; flowers mauve-pink; *Aster aethiopicus* Burm. (COMPOSITAE) (No. 1336), hispid, with long peduncles, rays pale blue, disk yellow. *Lasiosiphon anthylloides* L. f. (THYMELAEACEAE) (No. 1338), flowers greenish-yellow; and a yellow legume, *Aspalathus ciliaris* L. (No.



Range of *Ilex mitis* Radlk. (AQUIFOLIACEAE), the only "Holly" found in Africa south of the northern tropic; the detached circle represents the Cameroons Mountain.

1340), shrublet 1 ft., with fascicles of short acicular leaves and sessile heads of flowers surrounded by pilose leaves.

Our No. 1337 was that intriguing species of *Cliffortia*, *C. graminea* L. (ROSACEAE), so aptly named as to scarcely require describing, but a veritable trap for the tyro, with its grass-like leaves, leaf-sheath and "ligule" all complete. It is widely spread in wettish places in coastal districts, from the Cape Peninsula, Paarl and Tulbagh eastwards to Albany and Bathurst. I hope my description will be sufficient to enable the student to become aware of this "trap", so that he may practise it on others.

At 14 miles east of Knysna were collected *Disa filicornis* Thunb. (ORCHIDACEAE) (No. 1341), with scarlet flowers, and *Graderia scabra*

Presl (SCROPHULARIACEAE) (No. 1344), with linear leaves and pink flowers.

I was interested to see at last Plettenberg's Bay,¹ a classical botanical locality, and here we found a few species in flower. Among them were a *Gasteria*, *G. acinacifolia* Jacq. (LILIACEAE) (No. 1345), with the lower part of the perianth-tube red, the upper part greenish; *Gazania uniflora* Sims (COMPOSITAE) (No. 1346), prostrate in sea-sand, with entire oblanceolate leaves pure white below, and yellow flower-heads.

At the Bitou River² a prickly *Solanum* proved to be the real *Solanum rigescens* Jacq., although for some reason the late N. E. Brown has scored out the name on all the Kew sheets, several of which seem to match perfectly with Jacquin's figure. Another plant gathered here was *Arctotis petiolata* Thunb. (No. 1361), prostrate, rooting at the nodes, leaves lyrate, white-woolly below, flower-heads yellow.

On the hills just east of Keurbooms River we added some interesting species, including two grasses: *Eustachys paspaloides* (Vahl) Lanza & Mattei (No. 1364), with about four umbellate secund spikes about 4 cm. long, and *Lasiochloa longifolia* Kunth (No. 1365), with very narrow leaves and dense hairy spikes, an orchid with light-mauve flowers, *Satyrium maculatum* Burch. (No. 1366), a white-flowered Selaginaceous plant, *Selago corymbosa* L. (No. 1367), a prostrate *Psoralea*, *P. decumbens* Ait. (No. 1368), with very glandular cuneate leaflets and small pale-blue to white flowers, and another striking little orchid, *Holothrix villosa* Lindl. (No. 1368a), with a spongy orbicular radical leaf and spikes of small flowers on a densely pilose peduncle, and *Pachycarpus dealbatus* E. Mey. (No. 1369), with undulate oblong-lanceolate leaves.

Between 2 and 3 miles east³ of the Keurbooms River we added several plants to our presses, only one of which need be specially mentioned. This was *Widdringtonia cupressoides* Endl. (CUPRESSACEAE) (No. 1380), a shrub up to 12 ft., known as the "Cape Cypress", "Berg Cypress", or "Sapree-hout". It is distributed from the Table Mountain and Worcester divisions in the coastal districts eastwards to the King Williamstown Division. It grows in the open veld on tops of hills.

Approaching Forest Hall⁴ (10 miles east of Keurbooms River) we stopped to collect, the most conspicuous plant being the well-named *Lanaria lanata* (L.) Dur. & Schinz (No. 1384), a haemodoraceous plant with elongated very narrow closely nerved leaves, and long-

¹ Also collected here: No. 1347, *Erica speciosa* Andr. (ERICACEAE), flowers red with green tips, near the sea; 1348, *Mesembryanthemum* sp., near the sea; 1349, *Helichrysum teretifolium* Less. (COMPOSITAE), shrub, leaves ericoid, flower-heads white; 1350, *Crassula expansa* Ait. (CRASSULACEAE), on rocks, small red leaves and white flowers.

² Also collected: 1363, *Asparagus Kraussii* Baker (LILIACEAE).

³ Also collected: No. 1371, *Aster aethiopicus* Burm. (COMPOSITAE); 1372, *Barosma lanceolata* Sond. (RUTACEAE); 1373, *Hermannia flammea* Jacq. (STERCULIACEAE); 1374, *Metalasia muricata* Less. (COMPOSITAE); *Ursinia heterodonta* N.E. Br. (COMPOSITAE); 1375a, *Muraltia stipulacea* Harv. (POLYGALACEAE); 1376, *Thesium* sp. (SANTALACEAE); 1377, *Satyrium stenopetalum* Lindl. (ORCHIDACEAE), flowers sweet-scented, creamy-white; 1378, *Athanasia dentata* L. (COMPOSITAE); 1378a, *Gerbera serrata* Druce (COMPOSITAE); 1379, *Senecio paniculatus* Berg. (COMPOSITAE).

⁴ Also collected: No. 1381, *Landtia nervosa* Less. (COMPOSITAE); 1382, *Gnidia sericea* L. (THYMELAEACEAE); 1383, *Eulophia hians* Spreng. (ORCHIDACEAE).

pedunculate cymes of flowers covered with white plumose hairs. The family HAEMODORACEAE is found mainly in the Southern Hemisphere, and mostly in Australia. In South Africa there are four genera, *Lanaria*, *Wachendorfia*, *Dilatris* and *Barbaretta*, three genera in South America, and two in North America.

On the Forest Hall estate¹ towards the sea a fairly local *Euphorbia*, *E. ericoides* Lam. (No. 1385) occurred here and there, with densely arranged ericoid leaves hooked at the apex, and small corymbs with reddish bracts. We found vast quantities of *Ornithogalum aureum* (No. 1386), treated as a variety of *O. thyrsoides* in the *Flora Capensis*, but very different from that species as we see it imported into England.

At the top of Groote River Hill (24 miles east of Keurbooms River) we stopped the cars to collect three COMPOSITAE, *Peyrouisia argentea* Compton (No. 1388), a rayless plant with silvery oblanceolate leaves, *Cenia turbinata* Pers. (No. 1389), and *Osteospermum scabrum* Thunb. (No. 1390), our plant of the last-mentioned a good match of Thunberg's type, with acicular leaves and small very shortly pedunculate solitary flower-heads.

At Witte Els Bosch, where we stayed for a few days at the residence of our kind host, a conspicuous ground-orchid was *Disa chrysostachya* Swartz (No. 1391), stiffly erect to 2½ ft., with conspicuously bracteate spikes of salmon flowers.

The mountain slopes above Witte Els Bosch yielded a considerable collection of striking and interesting plants which deserve taxonomic sequence :—

Collected on Mountain Slopes above Witte Els Bosch

LIGNOSAE (WOODY DICOTYLEDONS)

ROSACEAE—*Cliffortia illicifolia* L. (No. 1411): shrub; leaves sessile, broadly oblong, with prickly teeth in the upper half, glabrous.

PAPILIONACEAE *Crotalaria purpurea* Vent. (No. 1402): straggly shrub, up to 8 ft.; leaves obovate; flowers crimson, few in racemes; fruits oblong, bladder-like, stipitate, glabrous.

ERICACEAE—*Erica densifolia* Willd. (No. 1393): shrub with fascicles of small leaves; flowers solitary in each fascicle, dark red; corolla curved, 3 cm. long. *E. Sparrmannii* Linn. f. (No. 1398): leaves setose; calyx and corolla densely setose, the latter greenish-yellow. *E. Nabea* Guthrie & Bolus (No. 1401): leaves slightly setulose-ciliate; flowers pale greenish-yellow; sepals much longer than the corolla, glumaceous. *E. diaphana* Spr. (No. 1403): on rocks; leaves glabrous; corolla-tube red, lobes green, 2.5 cm. long. *E. triceps* Link (No. 1408): on tops of lower mountains; leaves very small, glabrous; flowers small, white.

RHAMNACEAE—*Phyllica debilis* E. & Z., var. *Fourcadel* Schönland (No. 1407): low shrublet with small ericoid sessile cordate based leaves and small heads of white-woolly flowers.

RUTACEAE—*Barosma lanceolata* Sond. (No. 1399): shrub; leaves lanceolate, obtuse, thick, conspicuously glandular below; flowers mauve on puberulous pedicels; fruits long-horned.

RUBIACEAE—*Canthium Mundtianum* Cham. & Schl. (No. 1406): small tree, in forest; leaves obovate, with hairy petioles and hairs in the axils of the nerves below; flowers few, in small cymes, margins of corolla-lobes woolly.

¹ Also collected: No. 1386a, *Aspalathus nigra* L. (PAPILIONACEAE), and at 12 miles east from Keurbooms River, *Gnidia obtusissima* Meisn. (1387), 4 ft., with pale-cream flowers, and *Ochna atropurpurea* DC. (1387a).

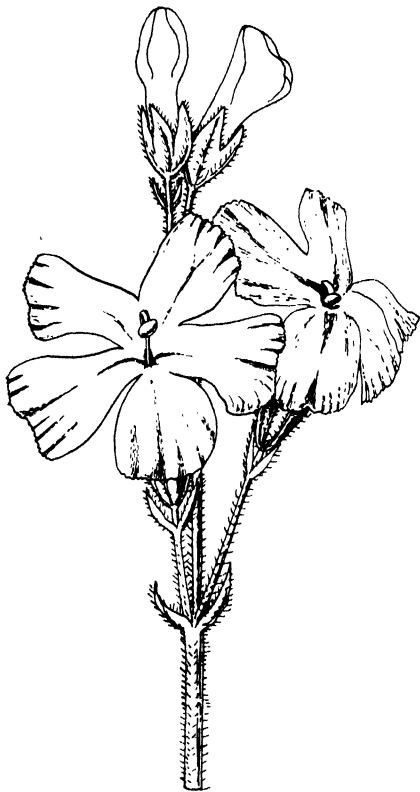
HERBACEAE (HERBACEOUS DICOTYLEDONS)

GENTIANACEAE—*Sebaea elongata* E. Mey. (No. 1397): herb about 1 ft. high; leaves sessile, ovate, several-nerved from the base; flowers densely cymose, pale yellow.

COMPOSITAE—*Brachylaena nereifolia* (L.) R. Br. (No. 1405): tree 25 ft. near stream; leaves broadly oblanceolate; petioles puberulous; flower-heads in close panicles, unisexual. *Osteospermum junceum* Berg. (No. 1394): about 8 ft., and a very striking species; leaves obovate, on longish petioles, dentate, very thick; heads in panicles on very woolly stalks, rays rich yellow. *Stoebe alopecuroides* Less. (No. 1400): shrub 8 ft., in forest;

leaves Juniper-like, twisted; heads in dense terminal spikes; pappus plumose; endemic in this part of South Africa. *Helichrysum felinum* Less. (No. 1396): leaves very short and woolly; flower-heads white, in small clusters on long peduncles. *H. cymosum* Less. (No. 1409): like the last but heads pale-golden.

SCROPHULARIACEAE—*Harveya capensis* Hook. (No. 1392): saprophyte; leaves very small, glandular-pubescent; flowers white, showy.



Harveya capensis Hook. (SCROPHULARIACEAE), from a sketch made in the field by the author; flowers white.

MONOCOTYLEDONS

HAEMODORACEAE—*Lanaria lanata* (L.) Dur. & Schinz (No. 1395).

ORCHIDACEAE—*Satyrium maculatum* Burch. (No. 1410): stem leaves slightly overlapping; spur 1.5 cm. long.

At Witte Els Bosch our host drew our attention to a piece of the bush which had been allowed to grow undisturbed for twelve years after burning. The chief occupants were *Protea Mundii*, up to 15 ft. high, *Leucadendron eucalyptifolium*, also up to 15 ft., *Laurophyllum capense*, *Tetraria secans*, *Restio gigantea*, *Cliffortia ilicifolia*, *Berzelia attenuata*, *Penaea ovata*, the climbing *Chironia*, *C. melampyrifolia* Lam., *Cliffortia ferruginea*, a ground creeper, and a few examples of *Osteospermum moniliferum*, *Psoralea* and *Erica*.

After burning, comparatively few species take possession compared with the original vegetation, and all in the above list belong to advanced families from a phylogenetic point of view.

On 12th November we took our departure from the comfortable residence of our kind host at Witte Els Bosch, and resumed our journey eastwards, Dr. Fourcade accompanying us as far as the Gamtoos River, Humansdorp.

We soon stopped, at 5 miles¹ east of Witte Els Bosch, to collect in open veld on flats, and at the Kareedouw Pass, the latter place yielding a number of species deserving systematic arrangement :—

- ROSACEAE—**Rubus rigidus** *Smith* (No. 1421): leaves softly tomentellous below; petals present.
- PAPILIONACEAE—**Podalyria glauca** *DC.* (No. 1428): shrub 4 ft., near waterfall; leaves simple, oblong, silky below; flowers solitary on slender pedicels, purple and crimson. **Psoralea pinnata** *L.* (No. 1419). **Trifolium Burchellianum** *Ser.* (No. 1427).
- THYMELAEACEAE—**Gnidia stypelioides** *Meisn.* (No. 1422): shrub 3 ft.; leaves lanceolate, flowers solitary.
- EUPHORBIACEAE—**Cluytia alaternoides** *L.* (No. 1429): tall, straggly shrub; leaves oblong-elliptic, apiculate, with slightly jagged margins.
- CELASTRACEAE—**Hartogia capensis** *Thunb.* (No. 1420).
- DIPSACACEAE—**Scabiosa columbaria** *Linn.* (No. 1438): flowers pink or pale blue.
- COMPOSITAE **Aster Outeniquae** *Fourcade* (No. 1431): shrublet; leaves linear, toothed; heads white. **Helichrysum appendiculatum** *Less.* (No. 1433): basal leaves oblanceolate, woolly, stem leaves smaller; heads densely clustered, with reddish bracts. **H. gymnocomum** *DC.* (No. 1423): 2 ft.; leaves spatulate-oblanceolate, woolly; heads numerous, small, in flat close corymbs, with golden-yellow bracts. **H. cymosum** *Less.* (No. 1424): like the last but heads larger and fewer. **H. teretifolium** *Less.* (No. 1437): leaves small, ericoid, with sharp hooked points; heads pale straw-coloured, few in clusters. **Gerbera tomentosa** *DC.* (No. 1434): leaves elliptic; thick, obscurely dentate, thickly felted below; peduncles tomentose; ray-flowers white, red below. **Senecio rigidus** *L.* (No. 1430): 4 ft.; leaves irregularly lobed, with prickly teeth; heads numerous and small, yellow. **Ursinia oreogena** *Schltr.* (No. 1436): woody and straggly with multipartite leaves and long-stalked heads.
- IRIDACEAE—**Watsonia angusta** *Ker.* (No. 1425): 4½ ft. high; flowers scarlet. **Romulea rosea** *Eckl.* (No. 1435): leaves filiform; perianth carmine, outer segments streaked with dark purple.
- ORCHIDACEAE—**Satyrium parviflorum** *Swartz* (No. 1426): near a waterfall; 1½ ft. high; flowers dull red, in slender spikes. **Disa brevicornis** *Bolus* (No. 1432): up to 1 ft.; stem leaves narrowly lanceolate; flowers green, margined with red.

Between Kareedouw Pass and Humansdorp the flora gradually becomes poorer, and the only plant in flower was *Helichrysum striatum* *Thunb.* var. *villosum* (No. 1439), with narrow acute striate leaves and few heads with white bracts. We arrived at Humansdorp at six o'clock, the road being good, but with many gates which exhausted my stock of pennies and "tickeys" (threepenny bits), and at the last gate I had to sacrifice my one remaining sixpence, for I had not the heart to fail to reward the eager-faced native child waiting there, though I feared to queer the pitch for the next traveller.

Towards Humansdorp the mountains gradually fade out to low, prairie-like country, with the sea peeping through here and there on the southern horizon. But hereabouts there seemed little variety in the flora, after the rich Cape areas. We stayed the night at Humansdorp, posting off parcels of half-dried plants to the Bolus Herbarium.

Next day (Tuesday, 13th November) we set off for Jeffrey's Bay,

¹ Collected 5 miles east of Witte Els Bosch: No. 1412, *Helichrysum teretifolium* *Less.* (COMPOSITAE); 1412a, *Disa cernua* *Swartz* (ORCHIDACEAE); 1413, *Erica deliciosa* *Wendl.*; 1414, *Psoralea oligophylla* *E. & Z.* (PAPILIONACEAE); 1415, *Ursinia anethoides* *N.E. Br.* (COMPOSITAE); 1416, *Leucadendron adscendens* *R. Br.* (PROTEACEAE); 1417, *Wahlenbergia procumbens* *A. DC.* (CAMPANULACEAE); 1418, *Disparago ericoides* *Gaertn.* (COMPOSITAE).

a much-advertised place which did not come up to expectations as a seaside resort. Two miles east ¹ of Humansdorp we collected in open, small-bush veld, the most conspicuous plants being a gorse-like *Aspalathus*, *A. spinosus* L. (No. 1443), with yellow flowers, and *Corymbium glabrum* Linn. (*C. nervosum* Thunb.) (No. 1444), with long narrow closely nerved leaves, and dense flat corymbs of narrow deep-mauve flower-heads.

Corymbium is an interesting genus of COMPOSITAE in which the flowers in the heads are sometimes reduced to one, around which the long narrow bracts connive after the manner of a tubular calyx. Another rather striking plant here was *Chironia tetragona* L. f. (GENTIANACEAE) (No. 1445) with dull deep-pink flowers.

Jeffrey's Bay provided some typical Cape plants in flower as follows:—

Blepharis procumbens Poir. (ACANTHACEAE) (No. 1446), flowers deep sky-blue within setose-margined bracts. *Pelargonium peltatum* Ait. (GERANIACEAE) (No. 1447), climbing over bushes; leaves 5-lobed, deeply cordate at the base; flowers deep carmine-pink. *Aizoon glinoides* L. (FICOIDACEAE) (No. 1448), on sandy banks, leaves spatulate-orbiculate, woolly; flowers deep cream-yellow. *Gamolepis euryopoides* DC. (COMPOSITAE) (No. 1449), shrub 2½ ft. high; leaves pinnate; rays yellow. *Venidium canescens* DC. (COMPOSITAE) (No. 1450), low-growing, with yellow flowers. *Gamolepis munita* Less. (COMPOSITAE) (No. 1451), low shrublet with overlapping pinnate leaves with sharp points and elongated peduncles with small yellow flower-heads. *Lasiosiphon capitatus* (L. f.) Burtt Davy (THYMELAEACEAE) (No. 1452), shoots and leaves glabrous, the latter acute; perianth glabrous (usually pubescent in this species). *Monsonia ovata* Cav. (GERANIACEAE) (No. 1453), flowers pale yellowish-white. *Pteronia hirsuta* L. f. (COMPOSITAE) (No. 1454); prostrate, hirsute; bracts ciliolate, flowers mauve. *Gladiolus* sp. (IRIDACEAE) (No. 1455), flowers pink. *Chrysocoma microcephala* DC. (COMPOSITAE) (No. 1456), shrublet with many branches and very small ericoid leaves; heads ray-less, light golden-yellow. *Psoralea algoensis* E. & Z. (PAPILIONACEAE) (No. 1457), prostrate; leaflets obovate, emarginate, dotted with large glands; flowers in short bracteate spikes, purplish-blue. *Aster rotundifolius* Thunb. (COMPOSITAE) (No. 1458), leaves obovate, setulose; flower-heads solitary; rays deep blue. *Scabiosa columbaria* Linn. (DIPSACACEAE) (No. 1459), leaves pinnate; flower-heads blue, beset with dark bristles.

As Jeffrey's Bay proved disappointing and the hotel was under repair, we went on to stay the night at the Gamtoos River Hotel. Here we visited the seashore and saw on the beach the wonderful collection of sea-shells for which this coast is celebrated.

On the way, and about 6 miles ² from Jeffrey's Bay, among the

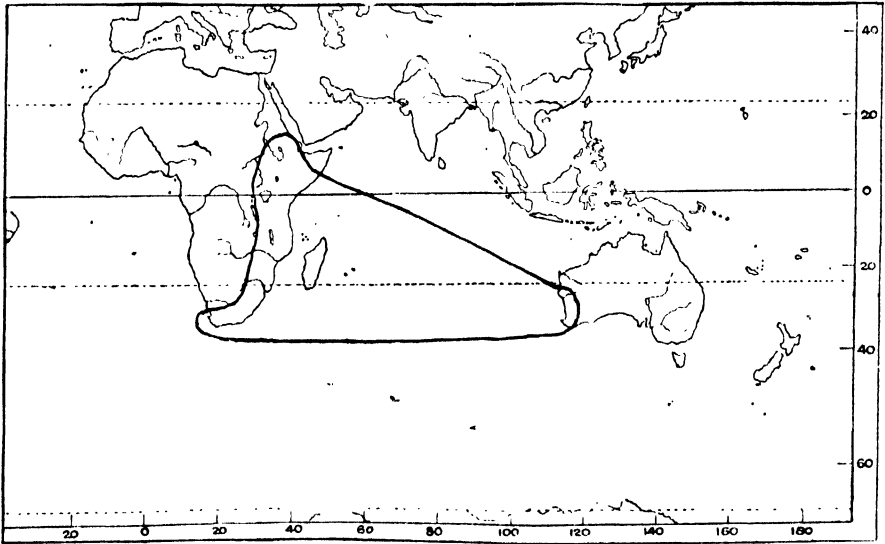
¹ Collected: No. 1440, *Aspalathus adelphaea* Eck. & Zeyh. (PAPILIONACEAE); 1441, *Watsonia Meriana* Miller (IRIDACEAE); 1442, *Erica glandulosa* Thunb. (ERICACEAE).

² Collected here: No. 1461, *Sutera pinnatifida* O. Ktze. (SCROPHULARIACEAE); 1462, *Prismatocarpus campanuloides* (Linn.) Sond. (CAMPANULACEAE); 1463, *Satyrion parviflorum* Swartz (ORCHIDACEAE); 1464, *Cyperus textilis* Thunb. (CYPERACEAE); 1465, *Pelargonium capitatum* Ait. (GERANIACEAE); 1466, *Senecio purpureus* Linn. (COMPOSITAE); 1467, *Lobelia Erinus* L. (LOBELIACEAE); 1468, *Helichrysum cymosum* Less. (COMPOSITAE); 1469, *Gazania longiscapa* DC. (COMPOSITAE).

plants we collected on the flats near a small stream, was a prickly-stemmed *Hibiscus*, *H. diversifolius* Jacq. (No. 1460), with pale lemon-yellow flowers with a dark carmine blotch at the base.

At the Gamtoos River we were very sorry to part from Dr. Fourcade, who had been our companion for about a fortnight, and under whose guidance we had been able to accomplish so much. Before leaving I explored the valley behind the hotel, in which were many tall *Euphorbias* (*E. grandidens* Harv.) and several representatives of tropical genera (see photograph, p. 259), an intrusion from the Addo Bush Karoo to the north.

In a kloof near Ferrieratown ¹ some rather striking species were col-



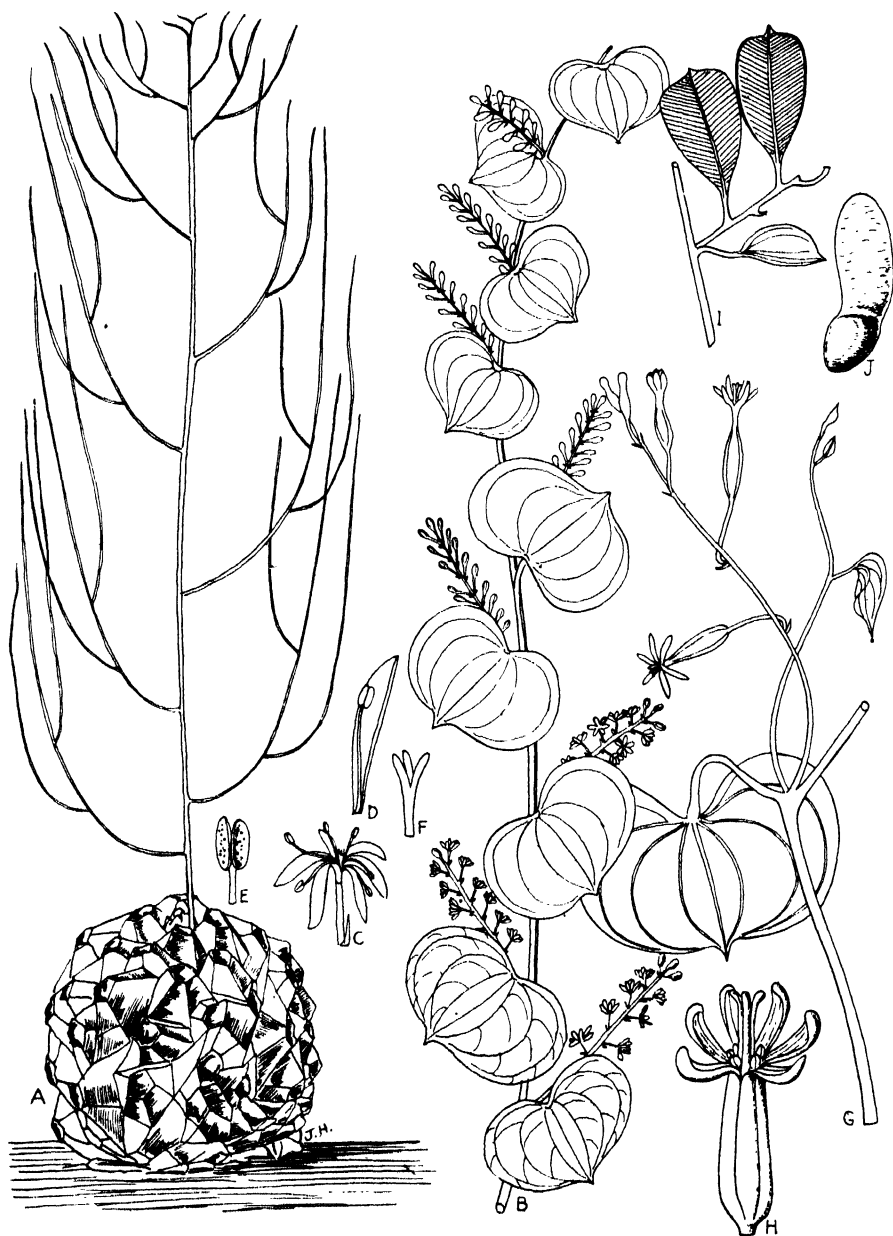
Range of *Athrixia*, a natural genus of COMPOSITAE.

lected, among them *Athrixia heterophylla* Less. (No. 1472), a shrublet 1½ ft. high, with linear much-recurved leaves, woolly below, and filiform bracts spread down the peduncle, the ray-flowers deep mauve. This genus of COMPOSITAE has an interesting distribution, which is shown on the map above. It ranges from the Clanwilliam Division right around the eastern districts to the eastern Sudan and Abyssinia, in Madagascar, and in South-western Australia. Its altitudinal range is also very considerable, one species being found as high as 11,000 ft., on the top of the Mont aux Sources in the Drakensberg.

We proceeded quietly towards Port Elizabeth, through rather low and not very picturesque country, the roads somewhat indifferent. At the top of the Gamtoos River Pass ² the most interesting plant col-

¹ Also collected: No. 1470, *Polygala myrtifolia* L. (POLYGALACEAE); 1471, *Gladiolus undulatus* Jacq. (IRIDACEAE); 1473, *Senecio longifolius* L. (COMPOSITAE); 1474, *Senecio nudiusculus* DC. ; 1475, *Pterocladus tricuspidatus* (Lam.) Sond. (CELASTRACEAE); 1476, *Myrica conifera* Burm. f. (MYRICACEAE).

² Also collected: No. 1479, *Helichrysum anomalum* Less. (COMPOSITAE); 1480, *Gnidia staphelioides* Meisn. (THYMELAEACEAE); 1481, *Phyllopodium cuneifolium* Benth. (SCROPHULARIACEAE); 1482, *Senecio paniculatus* Berg. (COMPOSITAE); 1483, *Arctotis virgata* Jacq. (COMPOSITAE).



Testudinaria elephantipes Thunb. (DIOSCOREACEAE).

A, habit; B, male shoot; C, male flower; D, stamen and perianth-segment; E, anther; F, rudimentary styles; G, female inflorescence; H, female flower; I, fruits; J, seed.

lected was *Hydrocotyle hermanniifolia* E. & Z. (No. 1477) (UMBELLIFERAE), woolly all over, with straggly branches, spathulate-oblanceolate leaves dentate towards the apex and axillary clusters of flowers; a locally distributed species.

Another species worth mentioning is *Lebeckia gracilis* E. & Z. (No. 1478), with slender acicular "leaves" jointed in the middle, small flowers in slender racemes, and reflexed, slightly sickle-shaped fruits. This species was wrongly reduced to *L. sepiaria* Thunb. in the *Flora Capensis*. The latter is probably confined to the Cape Peninsula, where it was collected by Thunberg, whilst *L. gracilis* E. & Z. extends from George to Uitenhage (Exsic.—Zwart River, George, *Fourcade* 1534; George, *Burchell* 5688; Knysna, *Burchell*; *Pappe*; Uitenhage, *Zeyher* 232; *Ecklon & Zeyher* 1336).

Beyond the Gamtoos River Pass ¹ in open scrub, at 17 miles from Jeffrey's Bay, a striking plant was *Lasiosiphon anthylloides* (L.) Meisn. (THYMELAEACEAE) (No. 1484), with silky oblanceolate leaves and heads of handsome yellow flowers. A very distinct Papilionaceous shrublet proved to be *Berberonia lanceolata* L. (No. 1486), one of the most widely spread of "Cape" plants, right from the Khamiesberg in Namaqualand to Port Elizabeth; leaves very narrowly lanceolate, very acute, with prominent parallel nerves and few yellow flowers at the ends of the shoots, the standard very silky. An *Erica*, *E. copiosa* Wendl. (ERICACEAE) (No. 1487), was also collected, with very small red flowers, and an *Ornithogalum* sp. (LILIACEAE) (No. 1488), with pinkish-cream flowers streaked inside with carmine.

At the foot and on the lower slopes of the Van Stadens Mountains, which here run parallel with the road, we found fairly rich stands of typical "Cape" plants, and the following were added to our presses: No. 1489, *Gladiolus grandis* Thunb. (IRIDACEAE), 2-3 ft.; flowers greenish-yellow, closely speckled with carmine; 1490, *Walafrida nitida* E. Mey. (SELAGINACEAE), an erect shrublet, 2-3 ft., with narrowly ovate leaves and short spikes of deep-mauve flowers; 1491, *Erica deliciosa* Wendl. (ERICACEAE), 2 ft. high, with small bell carmine-red flowers; 1492, *Chrysoscias argentea* (L. f.) C. A. Smith (PAPILIONACEAE) (see note below); 1493, *Cineraria Saxifraga* DC., on rocks; leaves long-petiolate, reniform, coarsely toothed, rays yellow; 1494, *Harveya purpurea* Harv. (SCROPHULARIACEAE), very dwarf and leafless, with deep-mauve corolla and yellow blotches on each lobe; 1495, *Aspalathus teres* E. & Z. (PAPILIONACEAE), shrub; leaves fasciculate, very sharply pointed; flowers yellow or rich reddish-brown; 1496, *Thesium foliosum* A. DC. (SANTALACEAE), a shrub 4 ft.; 1497, *Cuscuta africana* L. (CONVOLVULACEAE); 1498, *Widdringtonia cupressoides* Endl. (CUPRESSACEAE) (see p. 234); 1499, *Gamolepis munita* Less. (COMPOSITAE), with small pinnate leaves, and small yellow heads on elongated peduncles; 1500, *Ursinia anethoides* N.E. Br. (COMPOSITAE), woody; leaves small pinnate, rays yellow on both sides; 1501, *Chytia alaternoides* Linn. (EUPHORBIACEAE) (see p. 40); 1502, *Wachendorfia paniculata* Linn. f. (HAEMODORACEAE); 1505, *Leucadendron venosum* R. Br. (PROTEACEAE); and 1507, *Helichrysum striatum* Thunb. var. *villosum*.

Among the above perhaps the most interesting find was *Leuca-*

¹ Also collected: No. 1485, *Helichrysum appendiculatum* Less. (COMPOSITAE).

dendron venosum R. Br., recorded in the *Flora Capensis* from not farther east than the Zwartberg, but mentioned as occurring at Van Stadens by Ecklon in 1829–30. So I was the first to gather it since Ecklon's time, 100 years later. Since then Mr. Long has collected it in the Longmore Forest Reserve (Long No. 1048).

At 32 miles from Jeffrey's Bay, and approaching Port Elizabeth, we paused to put in our press a *Pelargonium* growing in flats and making a pretty show. This proved to be *P. ovale* (Burm. f.) Harv., with ovate-elliptic serrate leaves and beautiful pink petals, two of them suffused with carmine.

Here we collected three fine herbarium sheets of a rare plant, *Chrysoscias argentea* (L. f.) C. A. Smith (No. 1492), to be found in the *Flora Capensis* under *Rhynchosia leucoscias* Benth. (*Fl. Cap.* 2 : 249). There is perhaps some justification for resuscitating the small group of species included in Section *Chrysoscias* in the *Flora Capensis* as a separate genus, the genus *Chrysoscias* of E. Meyer (*Comm.* 139 : 1835–37).¹ The only difference seems to be the *umbellate* inflorescence, which is sometimes 1-flowered. If retained under *Rhynchosia*, our plant would still require a new specific name, being founded on *Ononis argentea* Linn. f. (1781), because there is already a valid species of *Rhynchosia* bearing this specific name—namely *R. argentea* Harv., founded on the *Glycine argentea* of Thunberg.

Our plant was climbing over bushes, the leaflets silky pilose with white hairs on the lower surface, the rich yellow flowers 3–4 in an umbel, the pod silky; stipules large, ovate, at length falling off—a very distinctive plant.

The genus as understood is a homogeneous one, both as to distribution and close relationship of the species, with one exception. This is *C. pauciflora* (Bolus) C. A. Smith, founded on *Rhynchosia pauciflora* Bolus, from the Carolina high veld of the Transvaal. In this the inflorescence is reduced to one flower, and the petals scarcely exceed the calyx. The remainder of the species are found from the Bredasdorp Division eastwards to the Zuurberg.

The road towards Port Elizabeth was lined on each side by crowds of exotic *Acacia* seedlings, and we arrived at the city at five o'clock, after a fairly strenuous day. Here it had been arranged for Mr. R. A. Dyer,² botanist of the Botanical Survey, and stationed at Grahamstown, to meet me, and he accompanied me as far as Durban, sharing the task of collecting and drying specimens. The advantage of such help from members of the Botanical Survey was very great, and I cannot thank Dyer too much for his assistance and genial companionship through the pleasures, trials, and troubles incidental to a collecting tour through this south-eastern part of Africa. Some months later, on my return journey, Dyer again joined me at Fauresmith, and accompanied me as far south as Meirings Poort, where a mishap to the car, a thunderstorm and flood terminated our association somewhat abruptly.

At Port Elizabeth I was very pleased to meet again a former Kew colleague, in Mr. F. R. Long, in charge of the parks, open spaces, etc. In my diary I find the following note about him :—

¹ See C. A. Smith in Burtt Davy, *Fl. Transvaal*, 1, 2 : 406 (1932).

² Now Dr. R. A. Dyer, Chief of the Division of Plant Industry, Pretoria.



General Smuts and F. R. Long at Port Elizabeth.

“Long has transformed Humewood [a suburb of the town] from a tangle of *Acacia cyclops* and sand-dunes into beautiful lawns and rockeries full of interesting plants and native succulents reminiscent of the ‘Chines’ of Bournemouth and other south coast resorts in England. Port Elizabeth should be and is very proud of Long.”

Since my visit Mr. Long has done a good deal of botanical exploration and has contributed some fine collections to the National Herbarium at Pretoria, the Bolus Herbarium, and Kew, and I spent a very pleasant week with him and his family on my return from Rhodesia in 1930.

Mr. Jan Gillett now left me to rejoin his parents in the Transvaal, but we saw him again for a short time at Grahamstown.

Chapter XIII

PORT ELIZABETH VIA THE KATBERG, ST. JOHN'S, TO DURBAN

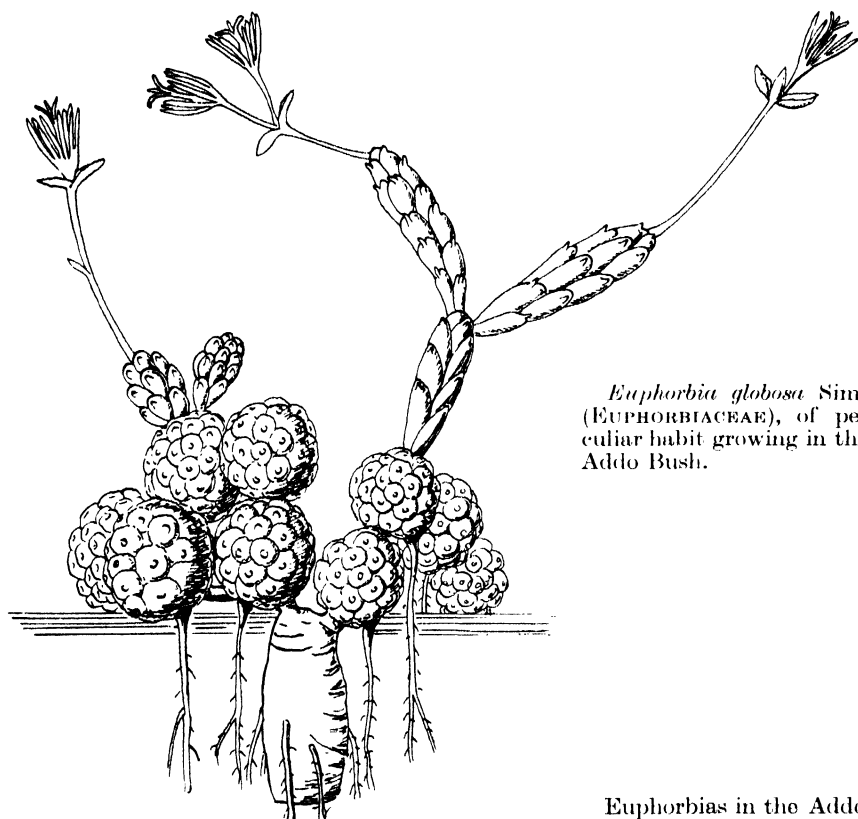
ON Friday, 16th November, Dyer and I started off on the second half of my trip to Durban, and we took the road to Uitenhage. On the way it was very interesting for me to see the sudden transition from the "Cape" or "South-Western" region to the Karoid scrub of the Addo Bush. At 12 miles we were in the thick of this formation, which seems to be a climax type derived from the Greater Karoo, the latter stretching for hundreds of miles to the north-west, as far as Namaqualand. It differs from the ordinary Karoo in the bulk of its vegetation being much taller and often collected into impenetrable, very spiny "forests" of succulent plants, and it is still the home of a small herd of wild elephants.

I was much interested to see here *Euphorbia globosa* Sims (No. 1511a) in full flower, with large green glands, the plant mostly in the form of small fleshy globose bodies growing together like a heap of rather large and soiled golf-balls (see figure, p. 246). The two species of *Pachypodium* found in this region were here growing near each other: *P. succulentum* (L.f.) A.DC. (No. 1509), a low fleshy bush about a foot high, with spirally arranged narrow hairy leaves and spine-like stipules; corolla-tube narrowly cylindric, softly pubescent outside. Its near relative, *P. bispinosum* DC. (No. 1510) is very similar indeed in its vegetative parts, but the corolla-tube is more widely funnel-shaped above the stamens, and it is glabrous outside.

Pachypodium belongs to APOCYNACEAE, and, with *Adenium*, differs from the other South African genera in having spirally arranged leaves. Some species are of peculiar and even fantastic growth-form, especially *P. namaquanum* Welw. (see photo, p. 173), which grows in the Orange River valley towards the mouth.

Growing in association with the *Pachypodiums* was a small succulent plant, *Heurnia barbata* Harv. (ASCLEPIADACEAE) (No. 1510a), with short ellipsoid fleshy plant bodies linked together at the base, and funnel-shaped bright-red flowers speckled with dark red, clothed inside with purple bristles. Plants of these were collected for growing at Kew. A shrublet with diminutive fasciculate leaves was *Sutera microphylla* (Benth.) Hiern. (SCROPHULARIACEAE) (No. 1511). Our No. 1512 was attached to *Euphorbia stellata* Willd., with a thick tuberous root-stock and short radiate branches with very small prickles.

Addo and the neighbourhood is a very hot part of the world, and on this day we were unfortunate to have in our wake a strong following wind, which not only caused our engine to get extremely hot, but also brought around us a continuous cloud of dust. Under such conditions, and in country like this, the motorist has to carry a large supply of water for the radiator, at any rate for an old-fashioned car such as ours.



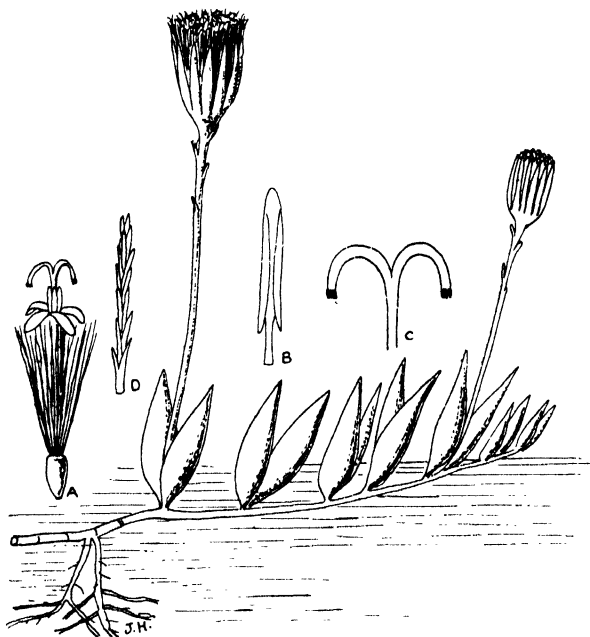
Euphorbia globosa Sims
(EUPHORBIACEAE), of peculiar habit growing in the Addo Bush.

Euphorbias in the Addo Bush, with R. A. Dyer.



In a valley near Addo¹ we collected some very distinct types of plants, including *Limonium linifolium* (L.f.) O. Ktze. (No. 1513), with narrow almost filiform leaves and one-sided panicles of small mauve flowers growing in a salt-pan; *Pentzia sphaerocephala* DC. (COMPOSITAE) (No. 1515), with finger-like leaves and yellow flower-heads; and *Senecio radicans* DC. (No. 1516), a prostrate species with fleshy lanceolate acute leaves and discoid heads of white flowers (see below).

S. radicans belongs to the *Kleinia* section of the genus, a section recently restored to generic rank by my late chief, Dr. O. Stapf. The writer of this book worked personally with Dr. Stapf for many years, and naturally saw "eye to eye" with him in most things. But in later



Senecio radicans DC. (COMPOSITAE) from the Addo Bush.

A, flower; B, anther; C, style-arms; D, part of pappus bristle.

life he began to split up genera rather drastically, and whilst I could follow him in many cases, I cannot accept the resuscitation of such a group as *Kleinia*, dependent entirely on habit, in this case being fleshy. On such analogy, *Euphorbia* and many other genera might equally well be divided. *Kleinia*, separated from *Senecio* on these lines, is, in my opinion, a heterogeneous group of species only some of which can be regarded as closely related.

Another distinct *Euphorbia* was *E. inermis* Miller (No. 1519a), with white flower-involucres subsessile at the top of thickish rod-like finely tuberculate stems.

¹ Also collected : No. 1514, *Blepharis capensis* (L.f.) Pers. (ACANTHACEAE).

Darkness overtook us before we reached Grahamstown,¹ and we passed through Howieson's Poort seeing only ghost-like forms of the interesting vegetation for which it is famed, chiefly from the collecting of Peter MacOwan.

The next morning I was interested to see the Albany Museum, where Dr. S. Schönland worked for so many years, and I was delighted to find the herbarium so well cared for. Miss Britten, herbarium assistant, immediately took over my plant-presses, which were full, and I had no further worry with them, and was free to start afresh through her kind help.

In the afternoon we made an excursion to Howieson's Poort, and the thirty or so species collected are enumerated below in systematic order.

Among the more interesting were specimens of *Euphorbia polygona* Harv., on which grew parasitically *Viscum minimum* Harv., the smallest species of mistletoe in the world. As my companion on this occasion, Mr. R. A. Dyer has since given an account of this interesting association in the *Flowering Plants of South Africa*, I shall take the liberty of repeating what he has said therein :—

"*Viscum minimum*, growing on *Euphorbia polygona*, is one of the most interesting examples of parasitism in the flora of South Africa. . . . *Euphorbia polygona* is a characteristic feature in the vegetation of the eastern Cape from Uitenhage to Albany division, where it grows socially on many quartzite outcrops. *Viscum minimum*, however, is found only rarely in this area. . . .

"The berries or fruits of *Viscum minimum* contain a very sticky substance by means of which they adhere to the host. It is surmised that birds eat the soft outer covering and wipe off the hard seed from their beak on to other plants, and so effect the distribution of the parasite. Within the seed is a disc or roundish pad-like structure, which is pushed out during germination, and becomes pressed to the surface of the host. A sucker then grows out from the cohering surface of the disc and penetrates the host, aided possibly by an excretion which dissolves the skin of the host at the point of contact. Connecting haustoria from the parasite link up with the vessels containing the food-supply of the host. Unlike other species of *Viscum*, the sucker growths or haustoria of *V. minimum* have ramifications within the host and emerge at various points for sexual reproduction. *Euphorbia polygona* appears to suffer no ill effects from the diminutive intruder."

Collected in Howieson's Poort, November 1928

LIGNOSAE (WOODY DICOTYLEDONS)

- PAPILIONACEAE—*Indigofera heterophylla* Thunb. (No. 1526): 8 in. high; leaflets oblanceolate, apiculate; flowers scarlet, on short lateral shoots.
- MORACEAE—*Ficus capensis* Thunb. (No. 1532): tree 35 ft. high, near stream; figs in panicles on the main stem; leaves undulately toothed.
- FLACOURTIACEAE—*Dovyalis tristis* (Sond.) Warb. (No. 1533): tree 15 ft. high; leaves on short branches, obovate; male flowers pale yellow, in clusters.
- PROTEACEAE—*Leucadendron ellipticum* (Thunb.) R. Br. (No. 1522): small tree; trunk 8 in. in diam.; leaves oblanceolate, 3-5-toothed at the apex; flowers orange-yellow.
- EUPHORBIACEAE—*Euphorbia stellata* Willd. (No. 1552): base fleshy, short; branches spreading, up to 10 cm. long, with paired spines 6 mm. long; flowers sessile, in terminal clusters.

¹ Collected on the way (66 miles from Port Elizabeth): 1520, *Pteronia paniculata* Thunb. (COMPOSITAE); 1521, *Phyllopodium cuneifolium* Benth. (SCROPHULARIACEAE).

- ANACARDIACEAE—**Harpephyllum caffrum** Bernh. (No. 1531): tree 25 ft. high; leaves pinnate; leaflets obliquely lanceolate; fruits like small plums.
- ASCLEPIADACEAE—**Pachycarpus dealbatus** E. Mey. (No. 1547): herb 1 ft. high; leaves lanceolate, undulately lobed; flowers in extra axillary umbels or clusters; corona dark red.
- RUBIACEAE—**Burchellia bubalina** Sims (No. 1546): here growing as a small shrub on rocks; leaves broadly lanceolate, setulose-pubescent below; corolla densely pubescent, red. **Canthium spinosum** (No. 1535): tree 15 ft. high; branches spiny; leaves ovate-orbicular; flowers in small cymes, very small; fruits oblique and 1-seeded or 2-lobed and 2-seeded.
- EHRETIACEAE—**Ehretia rigida** (Thunb.) Druce (No. 1534): tree 15 ft. high; leaves narrowly obovate, 2-3 cm. long; flowers deep mauve, in small terminal cymes.

HERBACEAE (HERBACEOUS DICOTYLEDONS)

- DROSERACEAE—**Drosera curviscapa** Salter (No. 1543): leaves in a rosette, spatulate; flowers in a second unbranched cyme.
- LOBELIACEAE—**Lobelia scabra** Thunb. (No. 1542): stems weak, decumbent; leaves linear, scabrid on the margin; flowers solitary in the upper axils, long-pedicellate; corolla hairy outside.
- COMPOSITAE **Vernonia capensis** (Houtt.) Druce (No. 1550): leaves linear, pubescent; flower-heads small, mauve. **Pteronia paniculata** Thunb. (No. 1520): shrub 2½–3 ft. high; leaves opposite, acicular; heads yellow, narrow, in close corymbs. **Gnaphalium purpureum** L. (No. 1524): herb up to 1 ft. high, appressed-silky all over; heads terminating the branchlets and terminal, forming spikes. **Helichrysum undatum** Less. (No. 1545): basal leaves *Plantago*-like, white-woolly below, 3-nerved; heads densely corymbose on long peduncles, with pink bracts. **Metalasia muricata** L. (No. 1529). **Cineraria Saxifraga** DC. (No. 1548): prostrate; leaves small, truncate-cuneate, toothed at the top; heads yellow, small. **Senecio coronatus** (Thunb.) Harr. (No. 1549a): woolly at the base; leaves obovate-oblancoate, closely dentate; heads few, yellow. **Senecio puberulus** DC. (No. 1538): small shrub with linear recurved densely setose-pubescent leaves and small yellow flower-heads. **S. albanensis** var. **discoideus** (No. 1544): leaves linear, densely tufted and persistent, finely toothed; heads few, corymbose, yellow, rayless. **Gamolepis euryopoides** DC. (No. 1530): shrub 3 ft.; leaves pinnately divided; heads solitary, yellow.
- SCROPHULARIACEAE—**Sutera campanulata** O. Ktze. (No. 1541): branches spreading from the base, woody; leaves ovate-triangular, coarsely dentate, shortly pubescent; calyx more than half as long as the mauve corolla.

MONOCOTYLEDONS

- IRIDACEAE—**Watsonia angusta** Ker. (No. 1527): about 3½ ft. high; leaves narrow, very closely nerved; spikes about 20–25-flowered; bracts 2-5 cm. long; flowers lilac, tube 4-5 cm. long. **Bobartia orientalis** Gillett (No. 1528): leaf subtending head up to 20 cm. long, terete; flowers yellow. **Gladolus permeabilis** De la Roche (No. 1551): leaves narrowly linear, short; bracts lanceolate, 1-3 cm. long; perianth-segments clawed, mauve-pink.
- ORCHIDACEAE—**Eulophia tuberculata** Bolus (No. 1547): leaves short and curved; flowers spaced, with spreading bracts, yellow outside, the lateral petals striped with carmine. **Satyrium membranaceum** Swartz (No. 1525): basal leaves suborbicular; stem-leaves bract-like, not imbricate; flowers pink.
- JUNCACEAE—**Juncus lomatophyllus** Spreng. (No. 1537): leaves broadly linear with thin margins, up to 25 cm. long and 1-5 cm. broad; peduncles overtopping the leaves; perianth-segments very acute. **J. inderscriptus** Steud. (No. 1536): tufted; leaves narrowly linear; panicles overtopping the leaves; perianth-segments very acute. **J. sphagnetorum** (Buchen.) Adamson (No. 1539): dwarf, with short filiform leaves, and small panicles.
- CYPERACEAE—**Pycneus lanceus** (Thunb.) Turrill (No. 1540): 1 ft. high; spikelets densely clustered, about 1 cm. long.

At Grahamstown I met several botanists, including Professor W. G. Smith, Miss Britten, lecturer in botany, and Mr. Hewitt, Director of the Museum, all of whom were very helpful during my stay in the city. Excursions were made towards Port Alfred, where the grass veld-country near Bathurst¹ reminded me of some parts of England, and to Pluto's Vale, about 19 miles from Grahamstown. Collections made on these trips are enumerated below. Among the more striking plants seen near Bathurst were *Satyrium parviflorum* Swartz (ORCHIDACEAE) (No. 1554), erect, 1-1½ ft. high, with spikes, 6-9 in. long, of green, two-spurred flowers; *Helichrysum appendiculatum* Less. (COMPOSITAE) (No. 1555), leaves woolly, heads crowded, with pale-yellow bracts tinged with pink; *Scabiosa angustiloba* (Sond.) B. L. Burt (DIPSACACEAE) (No. 1556), the deeply cut leaves densely silky-pilose, the pale-mauve flower-heads on long peduncles.

A tropical element was seen in *Pavetta capensis* (Houttyn) Bremek. (RUBIACEAE) (No. 1558), a shrub 8-10 ft. high, with narrow oblanceolate leaves and subsessile, close cymes of white flowers; *Gazania longiscapa* DC. (COMPOSITAE) (No. 1565), with very variable leaves, white-woolly below; *Thunbergia capensis* Retz. (ACANTHACEAE) (No. 1566), dwarf, with deltoid setulose-pubescent leaves and white flowers.

At the Blauwkrantz River the only plant to collect was a pretty *Jasminum*, *J. multipartitum* Hochst. (OLEACEAE) (No. 1569), a shrub with simple spoon-shaped leaves and white sweet-scented flowers, the buds tinged with red.

We botanised in the Fish River valley, about 19 miles from Grahamstown (towards King William's Town), and collected the following plants: *Cissus cirrhosa* (Thunb.) Willd. (AMPELIDACEAE) (No. 1570), with digitately 7-foliolate coarsely lobulate-dentate leaflets and small yellow flowers; the Spekboom, *Portulacaria afra* Jacq. (PORTULACACEAE) (No. 1571), a fleshy shrub up to 6 ft. high, with small obovate rounded leaves and short spikes of small pink flowers; *Sarcostemma viminalis* R.Br. (ASCLEPIADACEAE) (No. 1572), leafless, with clusters of small greenish-yellow flowers, intertwined among Euphorbias; *Jatropha capensis* Sond. (EUPHORBIACEAE) (No. 1573), a small shrub, 2½ ft. high, with small fiddle-shaped leaves, sometimes hastate at the base; *Ammocharis coranica* (Ker Gawl.) Herb. (AMARYLLIDACEAE) (No. 1574), leafless at time of flowering, scape 9 in., with an umbel of pedicellate dull-red flowers; *Raphicnacme Zeyheri* Harv. (ASCLEPIADACEAE) (No. 1575), very dwarf, leaves lanceolate, puberulous; flowers small, puberulous, bright green; *Ipomoea ficifolia* Lindl. (CONVOLVULACEAE) (No. 1576), a twiner with widely cordate, shortly 3-lobed leaves, cobwebby below, and crimson flowers.

At Pluto's Vale, on ledges of rocks, grew *Haworthia translucens* Harv. (LILIACEAE) (No. 1577), like a miniature Aloe, with a ball of closely set

¹ Collected near Bathurst, 18th November: No. 1553, *Melothria punctata* Cogn. (CUCURBITACEAE); 1554 (see above); 1555 (see above); 1556 (see above); 1557, *Hermannia candicans* Ait. (STERCULIACEAE); 1558 (see above); 1559, *Cassia mimosoides* Linn. (CAESALPINIACEAE); 1560, *Sutera campanulata* O. Ktze. (SCROPHULARIACEAE); 1561, *Tephrosia capensis* (Jacq.) Pers. (PAPILIONACEAE); 1562, *Dolichos falciformis* E. Mey. (PAPILIONACEAE); 1563, *Pterocelastrus tricuspidatus* (Lam.) Sond. (CELASTRACEAE); 1564, *Helichrysum rugulosum* Less. (COMPOSITAE); 1565 (see above); 1566 (see above); 1567, *Vigna triloba* Walp. (PAPILIONACEAE); 1568, *Indigofera heterophylla* Thunb. (PAPILIONACEAE).

prickly margined leaves. A striking plant was *Cadaba juncea* DC. (CAPPARIDACEAE) (No. 1578), a leafless Spartium-like shrub among rocks, with scarlet flowers; and *Azima tetracantha* Lam. (SALVADORACEAE) (No. 1579).

Two forms of *Pelargonium inquinans* Ait. (GERANIACEAE) (Nos. 1580, 1581), were conspicuous, the one with pale-pink flowers, the other with scarlet flowers; and *Crassula multicava* Lem. (CRASSULACEAE) (No. 1582), with petiolate ovate-orbicular leaves and small panicles of small pale creamy-white flowers.

Botha's Hill, near Grahamstown, produced *Lasiosiphon Meisnerianus* Endl. (THYMELAEACEAE) (No. 1583), a shrub 2 ft. high, with rich dark-yellow flowers; *Lasiospermum radiatum* Trev. (COMPOSITAE) (No. 1584), a small Chrysanthemum-like plant with white rays and woolly achenes. I was much interested to see growing together here *Cotyledon coruscans* Harv. (CRASSULACEAE) (No. 1602), and *C. teretifolia* var. *subglabra* (No. 1603), and a hybrid, *C. Bedseri* (No. 1604).

The flats between Botha's Hill and Grahamstown were here and there ornamented with *Geissorhiza foliosa* Klatt (IRIDACEAE) (No. 1586), with salmon-coloured flowers.

A visit was also paid to Dr. Schonland's farm at Aylsby,¹ about 18 miles along the road to Beaufort. I was much interested to meet him again, and to make the acquaintance of Mrs. Schonland, daughter of the late Professor Macowan. We walked around the farm and collected in a kloof from which a troop of baboons emerged on our arrival. The most interesting plant to me was *Protea macrophylla* R. Br. (PROTEACEAE) (No. 1600), a small tree (15 ft. high), growing with other "Cape" plants, such as *Metalsia* and *Passerina*.

Next day I visited the garden of Miss Blackbeard and saw a fine collection of succulents. In the evening I retired early to bed and remained there for three days with influenza.

In these parts of South Africa there occurs a member of a very interesting family of Monocotyledons, *Behnia reticulata* (Thunb.) Didrichs (PHILESIACEAE), though I did not come across it personally. PHILESIACEAE are found only in the Southern Hemisphere, *Philesia* being the only South African representative, and occurring from Uitenhage through the eastern provinces as far north as Gazaland. A closely allied genus is *Elachanthera*, also monotypic, which occurs at Nikol Bay, in North-western Australia. In addition, the genus *Luzuriaga* connects very closely the floras of Subantarctic South America and New Zealand, *L. marginata* Benth. & Hook. f., and *L. parviflora* Kunth, occurring in these respective regions, having even been regarded as the same species. A map is given here (see p. 252) to show the range of the family.

Before leaving Grahamstown, where I received every possible kind-

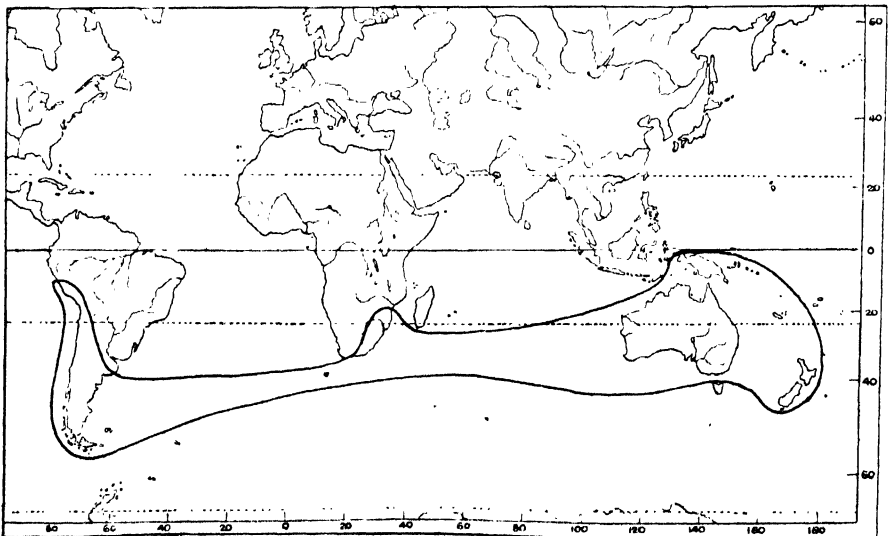
¹ Collected at Aylsby: No. 1587, *Muraltia squarrosa* (Linn. f.) DC. (POLYGALACEAE); 1588, *Lightfootia denticulata* DC. (CAMPANULACEAE); 1589, *Wahlenbergia undulata* A. DC. (CAMPANULACEAE); 1590, *Pelargonium radula* (Cav.) L'Hérit. (GERANIACEAE); 1591, *Helichrysum ericaefolium* Less. (COMPOSITAE); 1592, *Berkheya lanceolata* Willd. (COMPOSITAE); 1595, *Aster filifolius* Vent. (COMPOSITAE); 1596, *Lightfootia tenella* A. DC. (CAMPANULACEAE); 1597, *Chrysocoma tenuifolia* Berg. (COMPOSITAE); 1598, *C. microcephala* DC.; 1599, *Plantago carnosa* Lam. (PLANTAGINACEAE); 1600 (see above); 1601, *Ornithogalum aureum* Curt. (LILIACEAE).



Behnia reticulata Didrichs (PHILESIACEAE), which occurs in the South-Eastern districts.

ness during my short illness, I paid a visit to the Botanic Garden near the Rhodes College. It includes a very fine natural rockery, but, like other such institutions in South Africa, was then suffering badly from lack of funds. I noticed very fine examples of *Araucaria Bidwillii* Hook. and other trees, apparently eighty to one hundred years old. The remainder of the garden at the time of my visit was scarcely more than a public promenade.

On Monday, 26th November, I left with Mr. Dyer for the Katberg, the little car having been overhauled during my enforced stay. We passed through some very pretty scenery and observed prosperous-



Range of the Monocotyledonous family PHILESIACEAE, confined to the Southern Hemisphere; one monotypic genus, *Behnia*, in South Africa.

looking farms by the way. The road was good and the gradients not very steep. I was much struck by the beauty of Fort Beaufort, after mounting a small hill approaching the town. One's impressions, however, are affected by the type of country previously passed through. On the hills above Balfour we collected *Morea setacea* Ker (IRIDACEAE); *Chaetacanthus setiger* (Pers.) Lindau (ACANTHACEAE) (No. 1607); *Lotononis cytisoides* Benth. (PAPILIONACEAE) (No. 1608); and *Mystacidium capense* (Linn. f.), Schltr. (ORCHIDACEAE) (No. 1609). We arrived in the late afternoon at the Belvedere boarding-house, at the foot of the Katberg, set in nice scenery with well-wooded mountains round about.

Next morning (27th November) we motored to the top of the Katberg Pass (5100 ft., according to the guide-book), and collected on the grass veld at the top some 600 ft. higher up. The rocky gorge cut in the face of the south-east escarpment is very impressive (see photograph, p. 258), one side being a huge slab of rock several hundred feet high.

Round about we collected the following, which included a high percentage of COMPOSITAE :—

Collected on the Katberg, 27th November, 1928

LIGNOSAE (WOODY DICOTYLEDONS)

- ROSACEAE—*Alchemilla Woodii* O. Ktze. (No. 1652): densely tufted and densely pilose; leaves very small, deeply fid, pilose. *A. natalensis* Engl. var. *incurvata* Hamm. & Balle (No. 1641): branches elongated, purplish; leaves suborbicular, serrate, ciliate.
- PAPILIONACEAE—*Argyrobium speciosum* Eckl. & Zeyh. (No. 1676): perennial with a woody rhizome; stems pubescent in lower part; stipules ovate-lanceolate, 1·5 cm. long; leaves trifoliolate; leaflets oblanceolate to narrowly obovate, ciliate; racemes long-stalked; flowers yellow, striped with crimson. *Indigofera cuneifolia* Eckl. & Zeyh. (No. 1661): shrub 3 ft. high; flowers in short racemes, crimson. *Aspalathus rigescens* E. Mey. (No. 1658): gorse-like shrublet; branches tomentose; leaves ericoid, fasciculate, slightly pubescent; flowers yellow, solitary.
- THYMELAEACEAE—*Gnidia nodiflora* Meisn. var. *Wyliei* M. Moss (No. 1651): low-growing shrublet; leaves narrowly lanceolate, crowded, acute, ciliate; flowers axillary, greenish-white. *G. sericea* Linn. (Nos. 1630, 1671): shrub 2 ft. high; leaves ovate to narrowly obovate, densely silky; flowers greenish-white, in heads. *Lasiosiphon polyanthus* Gilg (No. 1682): shrub 1–2 ft. high; leaves elliptic, densely ciliate; flowers orange, in heads. *Passerina montana* Thoday (No. 1624): shrub 2 ft. high; branchlets woolly tomentose; leaves boat-shaped; flowers dull red.
- PROTEACEAE—*Protea subvestita* N.E. Br. (No. 1655): bush 8–12 ft.; leaves oblong-lanceolate, glabrous when mature, silky when young; bracts about 7-seriate, ciliate.
- POLYGALACEAE—*Polygala virgata* Thunb. (No. 1670): shrub 2–4 ft.; leaves linear; flowers in long, secund racemes, bright carmine. *Muraltia larcifolia* Eckl. & Zeyh. (No. 1637): shrub 1–2 ft.; leaves fasciculate, ericoid, subterete, glabrous; flowers deep mauve-crimson, axillary, sessile.
- EUPHORBIACEAE—*Cluytia impedita* Prain (No. 1644): leaves obovate-cuneate, glabrous; flowers green, subsessile. *Acalypha peduncularis* E. Mey. (No. 1638): stems villous; leaves subsessile, oblong-lanceolate, serrate; male spikes deep red; styles of female flowers crimson. *Euphorbia epicyparisiis* E. Mey. (No. 1663): herb 3½ ft.; leaves oblanceolate, mucronate, dense; bracts yellow, broad.
- ERICACEAE—*Erica cafferum* Bolus (No. 1618): shrublet 1–3 ft., densely branched; leaves glabrous; flowers numerous and very small, pale pink. *E. copiosa* Wendl. (No. 1619): similar to the preceding, but leaves puberulous and flowers grey.

SANTALACEAE—**Thesium congestum** R. A. Dyer (No. 1623): among rocks; branches short, dense; leaves with curved tips; flowers crowded.

RUBIACEAE—**Oldenlandia anatymbica** Hochst. (No. 1681): erect herb; leaves linear; flowers cream, in terminal clusters; corolla-tube 2 cm.; lobes 8 mm. long. **Pentanisia prunelloides** (Klotzsch ex Eckl. & Zeyh.) Walp. (No. 1683): near forester's cottage; small herb, pubescent; leaves lanceolate, scabrid; flower-clusters on long peduncles; flowers mauve.

HERBACEAE (HERBACEOUS DICOTYLEDONS)

CRUCIFERAE—**Heliophila glauca** Burch. (No. 1614): among rocks; decumbent herb with linear-lanceolate entire leaves and short racemes of deep-mauve flowers; fruits with a thick beak.

MOLLUGINACEAE—**Psammotropha androsacea** Fenzl. (No. 1627): tufted herb; leaves in dense fascicles tipped by a sharp bristle; flowers very small, greenish-yellow, in globose fascicles.

ILLECEBRACEAE—**Herniaria hirsuta** Linn. (No. 1632): prostrate herb from a woody tap-root, softly pubescent; stipules scarious; leaves obovate; flowers sessile.



Podranea Ricasoliana (Tanfani) Sprague (BIGNONIACEAE) (see p. 263).

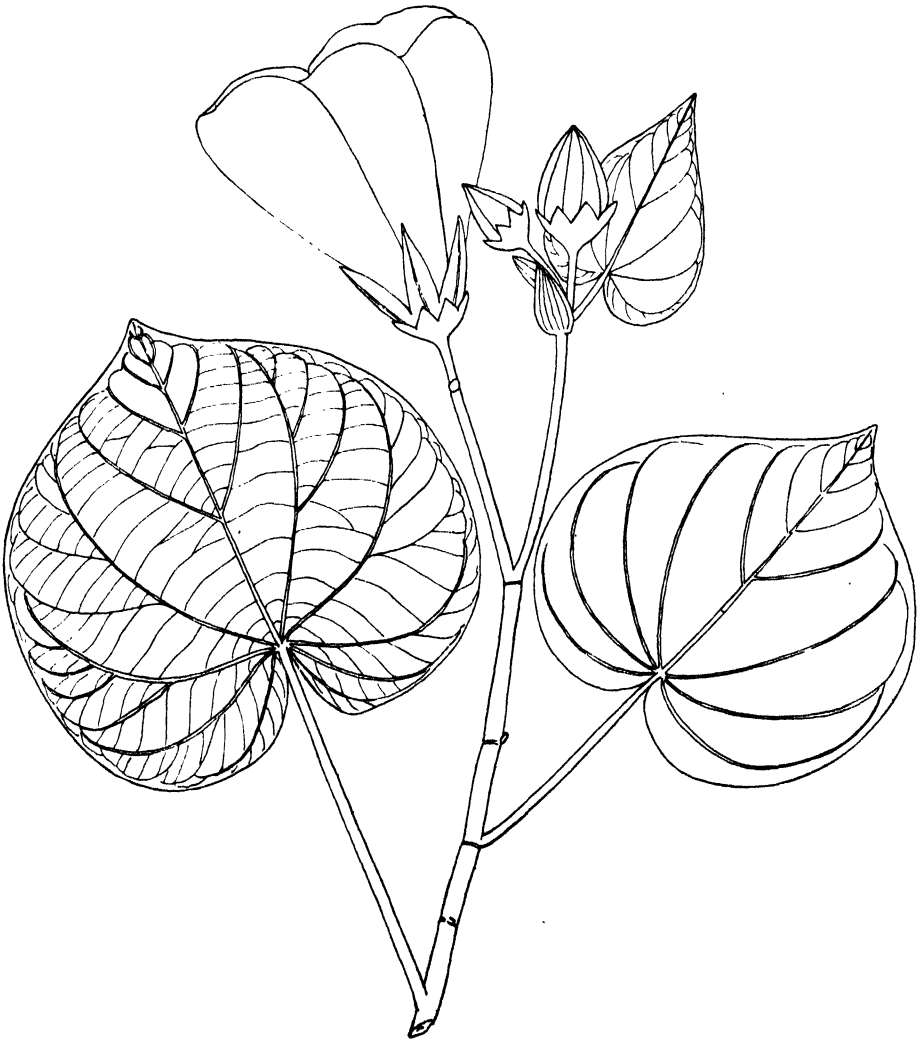
A, portion of leaf; B, calyx and style; C, corolla laid open; D, fruit; E, seed.

CAMPANULACEAE—**Wahlenbergia montana** A. DC. (No. 1613): among grass; very dwarf; branches very short, long-pilose; leaves oblanceolate, with thick margins; flowers white or pale blue, sessile. **W. rivularis** Diels (No. 1667): herb, 1½ ft. high; leaves sessile, ovate-elliptic, repand-dentate, thinly setulose below; flowers blue.

LOBELIACEAE—**Lobelia Erinus** Linn. (No. 1659): weak herb, with very variable leaves, the larger narrowly obovate and coarsely toothed; flowers deep blue. **L. decipiens** Sond. (No. 1634): stems tufted, with numerous small narrow scabrid leaves; flowers solitary, yellow.

COMPOSITAE—**Aster natalensis** Harv. (No. 1629): leaves narrowly oblanceolate, entire, densely strigose-pilose; heads 2.5 cm. diameter, rays blue. **Chrysocoma tenuifolia** Berg. (No. 1625): many short erect branchlets; leaves very small, ericoid; heads discoid, yellow. **Stoebe vulgaris** Levyns (No. 1665): shrub 5 ft.; leaves minute; flower-heads very small, numerous. **Hellechrysom fulgidum** Willd. (Nos. 1621, 1635): basal leaves rosulate, oblanceolate, 3-nerved, softly pubescent, stem leaves oblong, very sticky; heads sessile, few, crowded; bracts light golden-yellow. **H. felinum**

Thunb. (No. 1673): shrub up to 5 ft.; leaves oblong, sessile, faintly 3-nerved, woolly; heads corymbose, small; bracts white. **H. rugulosum** Less. (No. 1672): leaves linear, 1-nerved, woolly below; heads small, densely corymbose; bracts pale yellow. **H. splendens** Less. (No. 1664): shrubby; leaves numerous, linear, softly tomentose; flower-heads sessile, densely clustered, small; bracts bright yellow. **H. alveolatum** DC. (No. 1622): very similar to the last, but leaves shorter and heads fewer. **H. latifolium** Less. (No. 1633): leaves rosulate, obovate; heads in a dense pedunculate cluster, small; bracts brown. **Arrowsmithia styphelioides** DC. (No. 1639): shrublet; leaves imbricate and very sharp pointed, lanceolate, 3-nerved; heads sessile, solitary, with woolly-margined bracts; flowers rich yellow. **Senecio asperulus** DC. (No. 1626): stems densely clothed with the remains of the old leaves; leaves linear, entire, scabrid; flower-heads yellow, discoid. **S. speciosus** Willd. (No. 1669): herb 1 ft. high; leaves sessile, amplexicaul, deeply toothed, scabrid-puberulous; heads purple. **S. retrorsus** DC. (No. 1678): villous at the base; stem-leaves sessile, lanceolate, entire; heads yellow. **Lasiospermum bipinnatum** (*Thunb.*) Druce



Hibiscus tiliaceus Linn. (MALVACEAE) from Port St. John's (see p. 264).

(No. 1645): *Chrysanthemum*-like; leaves deeply bipinnate, glabrous; heads pedunculate; bracts with membranous margins; rays white; achenes very woolly. ***Dimorphotheca caulescens* Harr.** (No. 1647): leaves spatulate-oblancoolate, scabrid; rays white above, dark purple below. ***Euryops Dyeri* Hutch.¹** (No. 1640): shrublet with acicular entire or 2-3 lobed leaves and very long peduncles; rays yellow. ***Landtia hirsuta* Less.** (No. 1650): stemless herb; leaves obovate, with coarse reflexed teeth, setose above, closely woolly below; flower-heads nearly sessile; rays bright yellow. ***Berkheya oppositifolia* DC.** (No. 1677): leaves short, amplexicaul, auriculate, very spiny-margined, thinly woolly below; heads yellow. ***Gerbera natalensis* Sch. Bip.** (No. 1642): in grass; leaves small, obovate-elliptic, thinly pilose; rays white above, red below.

SCROPHULARIACEAE—***Dielsia reptans* Benth.** (No. 1668): stems prostrate; leaves ovate-rounded, coarsely dentate, digitately nerved; flowers axillary, long-pedicellate, mauve. ***Diascia rigescens* E. Mey.** (No. 1653): up to 3 ft.; leaves sessile, ovate, dentate; flowers paniculate, deep pink. ***Teedia lucida* Rudolphi** (No. 1636): low shrublet, in grass; leaves ovate-elliptic, dentate; flowers deep mauve.

SELAGINACEAE—***Hebenstreitia dentata* Linn.** (No. 1666): erect shrublet; leaves linear, dentate; flowers densely spicate, white with deep orange-red blotch.

GERANIACEAE—***Pelargonium zonale* Willd.** (No. 1675): at Black Bridge; a parent of the cultivated "Geranium"; flowers deep pink, veined with crimson.

BALSAMINACEAE—***Impatiens capensis* Thunb.** (No. 1674): leaves ovate-lanceolate, deeply crenate, with apiculate teeth, long-petiolate; spur as long as the petals.

LABIATAE—***Stachys aethiopica* Linn.** (No. 1631): herb pilose all over; leaves narrowly ovate, crenate; flowers crimson. ***S. malacophylla* Skan** (No. 1643): much-branched, prostrate; leaves small, ovate, dentate; flowers mauve.

MONOCOTYLEDONS

LILIACEAE—***Urginea modesta* Baker** (No. 1648): almost leafless; flowers few, white; bracts acuminate, as long as or longer than the pedicels. ***Anthericum elongatum* Willd.** (No. 1680): leaves 3-4 from the base; flowers white, with green stripe.

AMARYLLIDACEAE—***Agapanthus africanus* (Linn.) Beauverd** (No. 1685): on ledges of perpendicular rocks; leaves strap-shaped; flowers blue. ***Cyrtanthus Huttonii* Baker** (No. 1686): with the last; bracts nearly equalling the flowers, the latter orange-scarlet. ***C. stananthus* Baker** (No. 1649): in grass at top of Pass; flowers cream. ***Haemanthus puniceus* Linn.** (No. 1657): among rocks near water at top of Pass; leaves in a rosette; flowers very bright red; bracts speckled.

HYPOXIDACEAE—***Hypoxis filiformis* Baker** (No. 1646): leaves almost filiform; flowers small, orange-yellow inside, greenish outside.

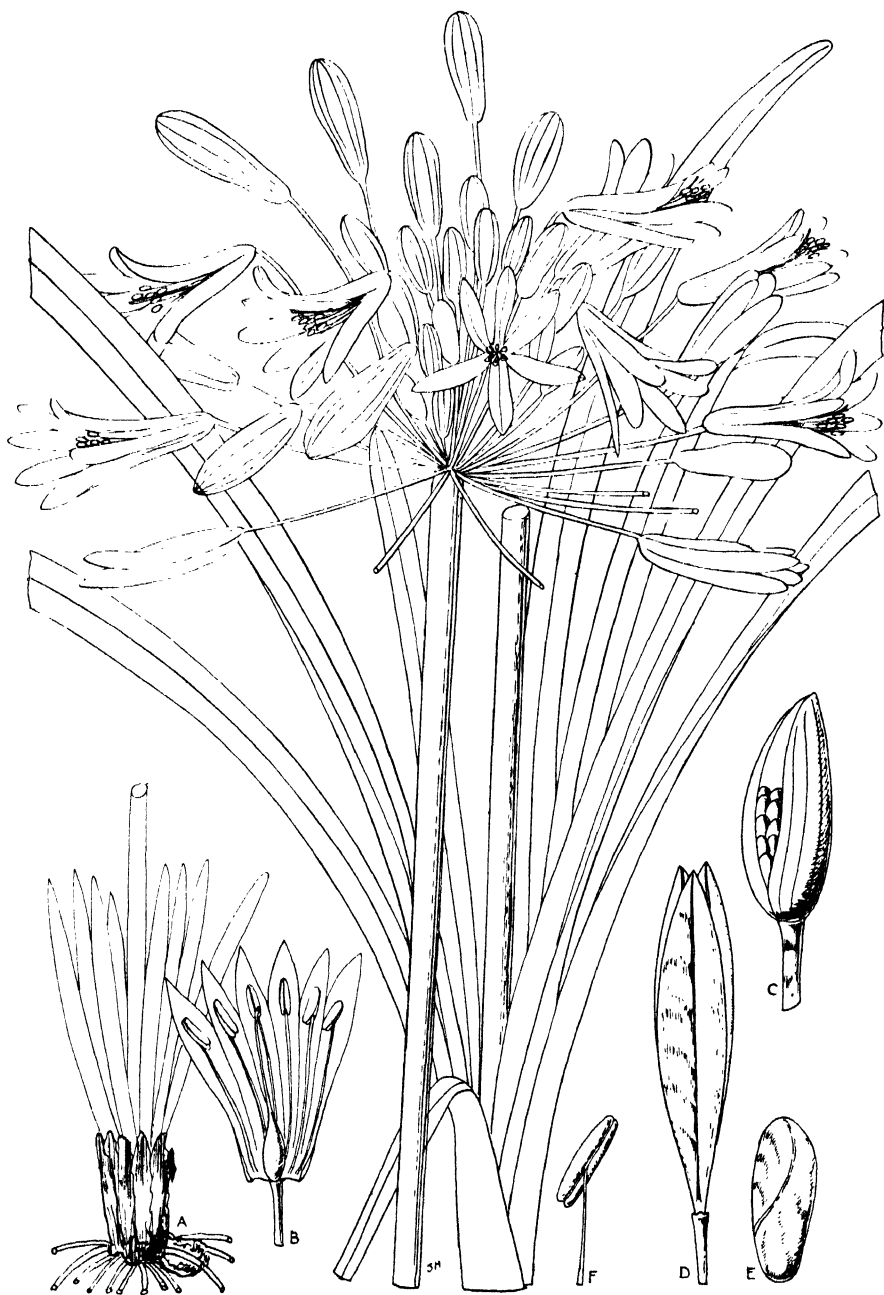
IRIDACEAE—***Gladolus edulis* Burch.** (No. 1679): slender; leaves very narrow; flowers not imbricate, white, striped with pink. ***Watsonia Pillansii* L. Bolus** (No. 1684): 2½ ft.; flowers pinkish-purple; perianth gradually narrowed from a broad funnel-shaped mouth. ***W. Meriana* Miller** (No. 1687): similar to preceding but pink, and perianth narrowly funnel-shaped (both growing in the Pass).

ORCHIDACEAE—***Disa aconitoides* Sond.** (No. 1660): bract as long as the flower; flowers pinkish-white, speckled with green.

¹ ***Euryops Dyeri* Hutch.** sp. nov.

Fruticulus 35 cm. altus, e basi ramosus, ramis vestigiis foliorum indutis; ramuli annotini breves, dense foliati. Folia acicularia, integra vel apice 2-3-loba, glabra, 1.5-2 cm. longa. Pedunculi solitarii, elongatissimi, usque ad 25 cm. longi, glabri. Capitula 2 cm. diametro, flava. Involucrum bracteae circiter 20, oblongo-oblancoolatae, marginatae, lineis resinosis notatae, 6-7 mm. longae. Flores radii flavi. Achaenia adpressae tomentosa. Pappi setae intricatae, breves.

South Africa: Stockenström Div.; top of the Katberg, 27th November 1928, *Hutchinson* 1640 (type in Kew Herbarium).



Agapanthus africanus (Linn.) Beauverd (AMARYLLIDACEAE).

A, young plant; B, flower (opened); C, young bud of inflorescence, showing bract; D, fruit; E, seed; F, stamen.

JUNCACEAE—*Luzula africana* Drège (No. 1617): very similar to the European *L. campestris* Linn. but taller.

CYPERACEAE—*Scirpus fleinioides* Kunth. (No. 1656): densely tufted; heads with dark-brown or almost black glumes. *Bulbostylis collina* Kunth. (No. 1616): leaves densely tufted, filiform; spikelets nut-brown, subtended by a long leafy bract.

On our descent from the Katberg we were fortunate to find in flower, on rocky ledges far above the road, the beautiful *Cyrtanthus Huttonii* Bak. (No. 1686), with orange-scarlet flowers, and near them the blue *Agapanthus africanus* (Linn.) Beauverd (No. 1685), an association I have since brought closer in a taxonomic sense.¹ As I was still rather weak-kneed from the influenza, I left it to my more agile companion to climb the rocky ledges, and I was soon subjected to a fusillade of fleshy bulbs to send to Kew.

Farther down the pass we gathered *Pelargonium zonale* Willd. (No. 1675), and *Impatiens capensis* Thunb. (No. 1674); with white flowers growing in dense shade close to water.

¹ In my *Families of Flowering Plants*, I have transferred *Agapanthus* to the AMARYLLIDACEAE, to keep company with *Cyrtanthus*.



View from the top of the Katberg.



[Photogr. : I. B. Pole Evans.

Euphorbia grandidentata Harv. (EUPHORBIACEAE) and *Aloe ferox* Mill. (LILIACEAE)
near Alice, Cape Province.

The next morning we left the Katberg for East London, and as the journey took us nearly all day, there is little to record in the way of collection. For many miles the country was rather hilly and somewhat bare grass veld, sometimes covered by wide expanses of *Senecio ilicifolius* Thunb. (No. 1662), which had completely taken possession of the veld. From Seymour,¹ a nice little English-looking place, we proceeded to Alice, where there is a native university, and arrived at King Williamstown at midday. Thence much of the country is *Acacia* savannah, close woodland occurring only in the gulleys. The *Senecio* mentioned above formed a groundsheet to the elegant little *Acacia* trees, mixed with another species, *Senecio retrorsus* DC. (No. 1698). We reached East London in the late afternoon, the remainder of the evening being occupied in labelling the plants collected on the Katberg the previous day.

Between King Williamstown and East London² one of the most

¹ Collected between Seymour and Alice : No. 1688, *Jasminum multipartitum* Hochst. (OLEACEAE), in woods climbing over *Euphorbia*, etc.; flowers white; 1689, *Marsdenia floribunda* N.E. Br. (ASCLEPIADACEAE), a trailer with ovate-lanceolate leaves and small corymbs of greenish-white flowers with mouse-like odour; 1690, *Delosperma laxipetalum* L. Bolus (FICOIDACEAE), leaves subterete, flowers white; 1691, *Microglossa mespilifolia* (Less.) B. L. Robinson (COMPOSITAE), a shrub with ovate coarsely dentate leaves and small corymbs of white flower-heads; 1692, *Cyrtorchis arcuata* (ORCHIDACEAE), epiphyte with numerous closely imbricate leaves and greenish-white flowers; 1693, *Polystachya Ottoniana* Reich, f., epiphyte, leaves few, about 9-nerved; flowers few, white, lip with orange midrib.

² Also collected : No. 1694, *Senecio speciosus* Willd. (COMPOSITAE), scabrid, heads purple; 1696, *Solanum supinum* Dunal, small shrub, leaves pinnately lobulate, prickly on the midrib below and on the branchlets; flowers solitary, white. 1697, *Hypoxis argentea* Harv., flowers yellow, mainly three together on a common peduncle; 1699, *Helichrysum pedunculare* DC., basal

interesting plants met with was *Scabiosa columbaria* Linn. (No. 1695), which extends right from South Africa through East Africa to the North temperate Regions.

The next morning (29th November) was spent seeing the town and docks of East London, and we left in the afternoon for the north *via* Mooiplaats,¹ collecting here and there by the way. At 14 miles² north-east from East London, in a good patch of ungrazed grass veld, we added the following species: *Vernonia capensis* (Houtt.) Druce (COMPOSITAE) (No. 1703), a species of which the name has recently been changed, a herb with linear leaves and dense corymbs of mauve flower-heads. *Thunbergia capensis* Retz. (ACANTHACEAE) (No. 1704), stems decumbent, pilose; leaves broadly ovate, with one or two teeth; flowers on long pedicels. *Tephrosia grandiflora* Pers. (PAPILIONACEAE) (No. 1706), shrublet 2 ft., large ovate stipules; flowers deep carmine. *Helichrysum appendiculatum* Less. (COMPOSITAE) (No. 1707), 18 in. high; stems leafy; leaves narrowly lanceolate, very woolly; heads corymbose; bracts pale lemon-yellow. *Gladiolus salmoneus* Bak. (IRIDACEAE) (No. 1708), flowers deep pink, three lower segments with crimson midrib. *Helichrysum quinquerre* (Thunb.) Less. (COMPOSITAE) (No. 1709), 2-3 ft. high, leaves ovate, semi-amplexicaul, strongly nerved; heads densely corymbose, with pale lemon-yellow bracts. *H. umbraculigerum* Less. (No. 1710), leaves cauline, narrowly obovate, white below; heads densely massed into a flat compound head with rich yellow bracts. *Pavetta tristis* Bremek. (RUBIACEAE) (No. 1711), small tree, 12 ft. high, narrow lanceolate leaves; flowers white; stigma green. *Phyllanthus maderaspatensis* Linn. (EUPHORBIACEAE) (No. 1712), woody; leaves elliptic, strongly nerved. *Zizyphus mucronata* Willd. var. *pubescens* (RHAMNACEAE) (No. 1713), shrub up to 15 ft. high, with softly tomentose branches; leaves trinerved; flowers green, in dense small clusters.

Between Mooiplaats and Komgha³ was a very handsome orchid, *Disa crassicornis* Lindl. (No. 1716), a robust plant 2 ft. high, with ovate-lanceolate overlapping stem-leaves, and pretty pink flowers speckled with light crimson; and *Massonia echinata* Linn. f. (LILIA-CEAE) (No. 1717), very dwarf, with two setose-pilose leaves, and purple flowers in sessile terminal clusters.

We stayed the night at Komgha, and next morning we were delayed a while with a leaking petrol tap, leaving at 10.15 by the road to Butterworth. Near the Great Kei River we encountered some very steep climbs, a country with deep valleys and rounded hills covered with short grass and *Acacia Karroo*. At the Kei River before entering the

leaves oblanceolate, with a vellum-like indumentum below; heads in a close corymb on a long almost leafless peduncle; bracts brown; 1700, *Lightfootia juncea* Sond., leaves lanceolate, pilose below; flowers shortly paniculate on a long peduncle, cream; 1701, *Helichrysum rugulosum* Less., stems leafy, leaves linear; bracts pinkish; 1702, *Wahlenbergia stellarioides* Cham. & Schltr., leaves narrowly lanceolate, very acute; flowers solitary, mauve.

¹ Collected at Mooiplaats: No. 1714, *Selago glomerata* Thunb. (SELAGINACEAE); 1715, *Teucrium capense* Thunb. (LABIATAE).

² Also collected: No. 1705, *Senecio variabilis* Sch. Bip. (COMPOSITAE); 1705a, *S. speciosus* Willd.

³ Also collected: No. 1718, *Polygala hottentotta* Presl (POLYGALACEAE); 1719, *Berkheya speciosa* (DC.) O. Hoffm. (COMPOSITAE); 1721, *Asclepias peltigera* Schltr. (ASCLEPIADACEAE).



Cyrtanthus Huttonii Bak. (AMARYLLIDACEAE), from the Katberg Pass.
A, half of perianth opened out; B, anthers.

native reserve we were stopped by police to see if we carried any spirits. Most of this country is short grass-veld, sometimes beautiful stretches extending for many miles.

We passed through Butterworth, and at length reached Hely Grove Hotel, which stands on the top of a hill. The trading-store was full of fine-looking natives, one of them very well built and quite unclothed. We had done no collecting that day.

On Saturday, 1st December, we departed early, and soon reached Umtata, a pleasant little town for many years the home of Miss Mason, who presented her fine collection of water-colour paintings of South African flowers to Kew; they are now in the Kew Museum. Beyond the town the grass veld continued, with heavy climbs and frequent descents on second gear, with sometimes as many as four tracks to select from, and this the main road to Durban!

In grass country near Libode¹ we made a fair collection, including the following: *Dianthus basuticus* Burt Davy (CARYOPHYLLACEAE) (No. 1726), with deeply-cut pink petals. *Pentanisia prunelloides* (Klotzsch) Walp. (RUBIACEAE) (No. 1723), better known as *P. variabilis* Harv., but the former an older specific name, a common herb in South-east Africa, with pale-mauve flowers. Two striking ground orchids, *Corycium nigrescens* Sond. (No. 1727), with short spikes of small blackish-brown flowers, rather skull-like, *Disa crassicornis* Lindl. (No. 1731), a handsome species with large broadish leaves and greenish-white flowers speckled with carmine, and, as the name implies, a large thick spur. Among the grass here and there were N. E. Brown's *Dierama atrum* (IRIDACEAE) (No. 1732), with blackish-purple flowers.

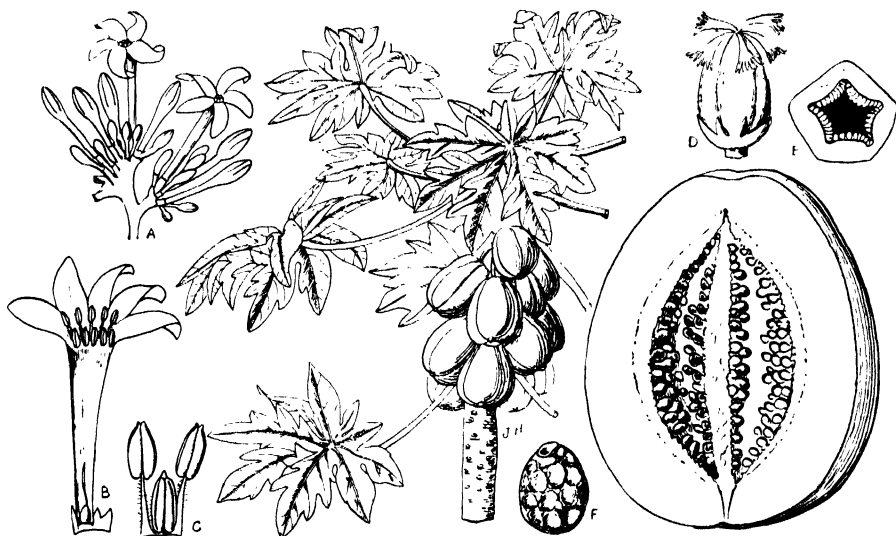
After we had driven through the rainy tops of several hills, where visibility was only a few yards, we were delighted to descend by numerous hair-pin bends into the very picturesque and well-wooded valleys flanking the St. John's River.

Descending the St. John's River valley I was impressed by the appearance of a remarkable mountain standing sheer from the undulating woody slopes below, a solid piece of rock 800–900 ft. high, with grass on top. The road was in a very bad state, previous rain and the track of a heavy lorry having made deep fissures, between which one had to steer the car. There was, therefore, no opportunity to collect, but nearing Port St. Johns in the fading evening light I noted tropical genera appearing, such as *Loranthus* (LORANTHACEAE), *Pavetta* (RUBIACEAE), *Ehretia* (EHRETIACEAE), *Vernonia* (COMPOSITAE), and some large examples of *Ficus capensis* Thunb. (MORACEAE).

We managed to pluck a few specimens here and there, including *Acridocarpus natalitius* Juss. (MALPIGHIACEAE) (No. 1734), the first I had seen of this more tropical genus, and, to my great joy, a rare genus

¹ Also collected: No. 1722, *Lobelia decipiens* Sond. (LOBELIACEAE), with slender straggling stems, short, linear leaves, and attractive flowers with a blue lip, white throat, and deep-crimson "standard"; 1724, *Denekia capensis* Thunb. (COMPOSITAE), leaves auriculate at the base, white-woolly below, flower-heads mauve-pink; 1725, *Anchusa capensis* Thunb. (BORAGINACEAE), stems setose and shortly pubescent, leaves narrowly lanceolate, flowers white; 1728, *Stachys aethiopica* Linn. (LABIATAE), stems ascending, pilose, leaves ovate-triangular, crenate, flowers white; 1729, *Xysmalobium involucratum* Dcne. (ASCLEPIADACEAE), leaves linear, pubescent, flowers small, green; 1730, *Helichrysum declinatum* Less. (COMPOSITAE), white woolly, leaves linear, sessile clusters of small heads with pale-yellow bracts.

created by a colleague: *Podranea Ricasoliana* (Tanfani) Sprague, belonging to the BIGNONIACEAE. I give a picture of this plant (see p. 254), which is known only from near Port St. John's, the flowers being a deep pink, lined inside with carmine. A small tree with deep-mauve flowers in dense clusters proved to be *Ehretia rigida* Druce (EHRETIACEAE) (No. 1736), a *Loranthus*, *L. Kraussianus* Meisn. (LORANTHACEAE) (No. 1737), with dull-red flowers, with a yellow neck and a green limb, a rare *Cissus*, *C. leptadenius* C. A. Smith (AMPELIDACEAE) (No. 1738), with numerous gland-tipped hairs on the shoots and small green flowers, a *Dioscorea*, *D. cotinifolia* Kunth. (DIOSCOREACEAE) (No. 1739), a twiner with clustered racemes of small white flowers, and a common and widespread *Vernonia*, *V. oligocephala* (DC.) Schultz Bip. (syn. *V.*



The Papaw, *Carica Papaya* Linn. (CARICACEAE), and fruit in vertical section.

A, inflorescence; B, longitudinal section of flower; C, stamens; D, ovary; E, cross section of same; F, seed. (From Hutchinson, *Families of Flowering Plants*.)

Kraussii Schultz Bip.) (No. 1741), a herb with ovate leaves, silky below, and deep-mauve flowers.

We arrived at Port St. John's at 6.15, after fording the rather deep river. At Port St. John's I was unable to accomplish very much, partly on account of the moist heat and partly because of the influenza a few days previously. I was much interested to see such typical strand plants as *Scaevola Jacquinii*, *Hibiscus tiliaceus* Linn. (MALVACEAE) (see figure, p. 255), and *Ipomoea biloba* Linn. (CONVOLVULACEAE), the last not in flower.

I must not omit to mention that whilst here I saw growing outdoors the Papaw, *Carica Papaya* L., and at breakfast in the hotel I tasted this delectable fruit for the first time.

It is a native of tropical America, and is, of course, widely grown in all the tropics and subtropics. Besides its edible fruit, it has many medicinal properties.¹

¹ See J. M. Dalziel, *The Useful Plants of West Tropical Africa*, 52 (1937).

We collected the following plants at and near Port St. Johns, 2nd December, 1928 :—

FILICES—**Polypodium polycarpon** *Cav.* (No. 1769): among scrub near the sea; very brittle; fronds oblanceolate, long-attenuated to the base, up to 7 cm. broad; sporangia densely arranged in oblique rows of clusters.

LIGNOSAE (WOODY DICOTYLEDONS).

- ANNONACEAE**—**Uvaria caffra** *E. Mey. ex Sond.* (No. 1763): twiner; branchlets with stellate hairs; leaves oblong-elliptic, obtuse, glabrous; flowers solitary, extra-axillary, nodding, greenish, depressed-globose.
- PAPILIONACEAE**—**Desmodium frutescens** (*Jacq.*) *Schindler* (No. 1759): shrub; leaves trifoliate; leaflets oblong-elliptic, reticulate and thinly pubescent below; flowers racemose, red.
- THYMELAEACEAE**—**Passerina rigida** *Wikström* (No. 1748): bush up to 10 ft.; branchlets softly white-tomentellous; leaves appressed, shining.
- PROTEACEAE**—**Protea Flanaganii** *Phillips* (No. 1828): shrub; leaves narrowly oblanceolate, glabrous; bracts glabrous.
- MALVACEAE**—**Hibiscus tillaceus** *Linn.* (No. 1765): small tree in sea-sand; leaves broadly ovate, entire, softly stellate-tomentellous below, 5–7-nerved from the base; flowers handsome, lemon-yellow with a purple eye. **H. pedunculatus** *L. f.* (No. 1770): 1½ ft., scabrid-stellate-pubescent; leaves trilobed; flowers deep pink, nodding on long peduncles.
- EUPHORBIACEAE**—**Tragia durbanensis** *O. Ktze.* (No. 1756): twiner; leaves ovate, cordate, dentate; cymes catkin-like but loose-flowered.
- RHAMNACEAE**—**Scutia myrtina** (*Burm.*) *Kurz* (No. 1747): bush 8 ft.; branches thorny; leaves obovate, emarginate; flowers in short pedunculate clusters, buds acute.
- AMPELIDACEAE**—**Cissus valerianifolius** *C. A. Smith* (No. 1750): twiner; leaves pinnately divided, segments serrate; flowers green, in small cymes.
- APOCYNACEAE**—**Lochnera rosea** (*L.*) *Reichb.* (No. 1745): near the sea; woody at the base, with short internodes; leaves oblanceolate, rounded at the apex; flowers deep pink.
- RUBIACEAE**—**Pavetta revoluta** *Hochst.* (No. 1752): shrub; leaves obovate, about 4 cm. long, glabrous; cymes of greenish-white flowers short. **P. tristis** *Bremekamp* (No. 1827): shrub; leaves narrowly oblanceolate, calyx almost truncate, corolla greenish-white. **Psychotria capensis** (No. 1758): shrub; leaves very broadly obovate, truncate or rounded at the top; flowers golden-yellow, in short cymes.

HERBACEAE (HERBACEOUS DICOTYLEDONS)

- CARYOPHYLLACEAE**—**Silene capensis** *Othl.* (No. 1757): herb with opposite oblanceolate leaves; petals pink.
- COMPOSITAE**—**Vernonia angulifolia** *DC.* (No. 1746): shrub; leaves triangular, sinuately lobulate-toothed; flowers white, in oblong cymes. **Ageratum conyzoides** *Linn.* (No. 1766): near the sea; a common tropical weed with mauve flower-heads. **Senecio oxydontus** *DC.* (No. 1762): near the sea; much branched and sub-shrubby; leaves ovate, coarsely lobulate and sharply toothed; flower heads small, yellow, in loose corymbs. **S. rhyncholeucus** *DC.* (No. 1743): sticky; leaves deeply pinnatifid; flower-heads few and small, white. **Osteospermum monilliferum** *L. var. rotundatum* (*DC.*) *Harv.* (No. 1751): more or less woolly; leaves broadly obovate-cuneate, repand-dentate; flower-heads yellow; fruit a berry. **Microstephium populifolium** (*Berg.*) *Druce* (No. 1754): in sea-sand (see p. 47). **Gazania longiscapa** *DC.* (*G. Potsii* *L. Bolus*) (No. 1744): near the sea; leaves very variable, entire to pinnately lobed, white below; heads yellow, with long-pointed, very acute bracts.
- CONVOLVULACEAE**—**Hewittia bicolor** *Wight and Arn.* (No. 1755): creeping in coastal belt; leaves ovate, thinly pubescent below; flowers yellow, with a purple eye. **Ipomoea palmata** *Forsk.* (No. 1767): twiner over bushes; leaves palmately divided to the base; flowers carmine.
- ACANTHACEAE**—**Asystasia coromandeliana** *Nees* (No. 1761): slender herb; flowers white, with mauve “herring-bone” markings inside the lower lip.

MONOCOTYLEDONS

IRIDACEAE—*Aristea Woodii* N.E. Br. (No. 1749): flowers blue, in narrow panicles.

ORCHIDACEAE—*Eulophia flaccida* Schltr. (No. 1742): among grass in coastal belt; slender herb from small tuberous roots; flowers dull purple, greenish-yellow outside. *E. speciosa* (R. Br.) Bolus (No. 1768): near the sea; 4 ft. high; leaves sword-shaped; flowers yellow, with purple "horse-shoe" on the lip.

CYPERACEAE—*Kyllinga alba* Nees (No. 1760): stems nearly bare; subtending leaves very long below the ovoid cluster of spikes.

GRAMINEAE—*Panicum deustum* Thunb. (No. 1753): culms leafy; leaves lanceolate, acuminate; panicles long-exserted; spikelets ellipsoid, 5 mm. long, pale green.

On Monday, 3rd December, we started at nine o'clock, and crossed the river by the pont for a very low charge. It was a long climb out of the valley, and at 8 miles we collected specimens of a beautiful *Loranthus*, *L. natalitius* Meisn. (LORANTHACEAE) (No. 1781), growing on Acacia, with long greenish-white flowers, the yellow limb with red tips, and in shady places a large white species of *Crinum* (No. 1771), which I have not been able to determine. An attractive creeper was *Jasminum angulare* Vahl (OLEACEAE) (No. 1778), with pinnate leaves and white flowers. There was much climbing and descending—in fact in this region we were always going either up or down, and it seemed a long way to Lusikisiki,¹ a spot with a melodious name, but in reality only a rough-looking trading-place.

The roads hereabouts were very bad, and on one occasion, descending a hill with deep oblique fissures cutting across the track, I nearly lost control of the car through jamming on the brakes too hard. After some waltzing from side to side, it eventually came to rest unharmed, when I found it necessary to resort to the medicine flask to restore my shaken nerves and bring some colour to my pallid countenance. At the same time I fear that I quite forgot to minister to the needs of my equally scared companion, a matter of reproach for several days afterwards, but I believe the only serious one during the whole of our delightful trip together. I am glad to say it was the nearest thing to a mishap that I had during my tour. Unfortunately, when the jolting took place our tins of fruit had apparently bounced out of the car, so two hungry botanists had for once to go sweetless for lunch.

¹ Collected between Port St. Johns and Lusikisiki: No. 1772, *Vigna hirta* Hook. (PAPILIONACEAE), leaflets lanceolate, acute, thinly setulose-pubescent, flowers purplish, young fruit villous; 1773, *Stephania abyssinica* var. *tomentella* Diels (MENISPERMACEAE), climber with peltate ovate-orbicular leaves pubescent below; flowers greenish-yellow in pedunculate cymes; 1774, *Dalechampia volubilis* E. Mey (EUPHORBIACEAE), twiner, leaves 5-lobed, with large ovate toothed bracts; 1775, *Senecio decurrens* DC. (COMPOSITAE), 2-3 ft., leaves narrow, decurrent, thinly woolly below; heads yellow; 1776, *Asclepias fruticosa* Linn. (ASCLEPIADACEAE), corolla greenish-white, fruits setose; 1777, *Xysmalobium undulatum* R. Br. (ASCLEPIADACEAE), leaves large, with numerous lateral nerves, flowers green, corolla-lobes densely setose inside; 1780, *Asparagus tetragonus* Presler ex Wright (LILIACEAE), prickly, with acicular cladodes, and racemes of small white flowers; 1782, *Conyza iwaefolia* (Linn.) Less. (COMPOSITAE), shrub, leaves lanceolate, toothed, flowers greenish-white; 1783, *Wahlenbergia denudata* A. DC. (CAMPANULACEAE), leaves lanceolate, strongly undulate, flowers blue; 1784, *Galtonia princeps* (Bak.) Decne. (LILIACEAE), 3-4 ft. high, with leaves about 4 cm. broad, and short bracteate racemes of greenish-white flowers, the lower pedicels elongating in fruit.

Our progress in these parts sometimes did not exceed 10–12 miles per hour, due to Government lorries having ploughed up the track after rain. Although our objective that day was Kokstad, we decided to stay the night at Flagstaff,¹ in case the roads beyond were as bad as those we had already passed over. We left this not very attractive spot early next morning, and arrived at Kokstad at midday, passing mostly through short grass-veld on the way.

Between Flagstaff and Kokstad² we added a few more species to our presses, a particularly interesting plant to me being *Sandersonia aurantiaca* Hook. (No. 1792), belonging to LILIACEAE and allied to *Gloriosa*, with orange-yellow bell-flowers (see figure, p. 267).

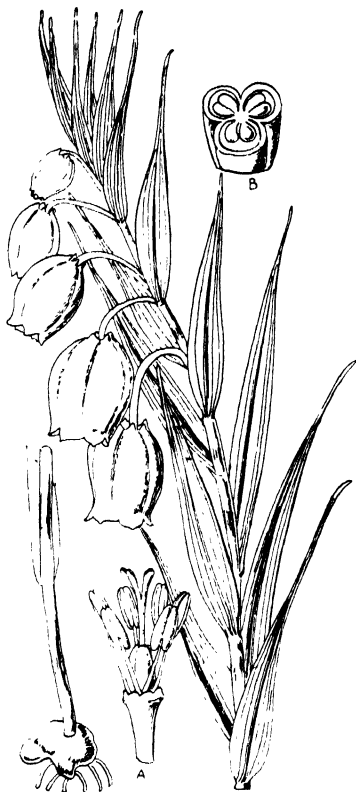
In the hotel at Kokstad we were surprised to meet a mutual friend in Dr. E. P. Phillips, Senior Botanist at Pretoria, who was visiting this place in connection with the poisoning of horses. Owing to rain that day, we occupied ourselves mainly with drying our specimens and despatching them by post to the Albany Museum.

Next morning (5th December) we left in glorious weather, passing Mt. Currie to the west of us. I regretted not having the time to explore it, but we gathered a few species near the lower slopes. Prominent among these were *Haemanthus Nelsonii* Baker (AMARYLLIDACEAE) (No. 1812), growing in rich brown soil among rocks by the

¹ Collected near Flagstaff in grass veld: No. 1785, *Senecio pterophorus* DC. (COMPOSITAE), 2–3 ft., leaves linear, woolly below, heads numerous in a large corymb, rays yellow; 1786, *Diascia sessilifolia* Grant (SCROPHULARIACEAE), leaves ovate, sessile, sharply toothed, flowers paniculate, pink; 1787, *Watsonia densiflora* Baker (IRIDACEAE), 2½ ft., bracts closely imbricate, flowers pink; 1788, *Senecio albanensis* DC. (COMPOSITAE), 5 ft., leaves elongate linear-lanceolate, glabrous, heads few, rays yellow.

² Also collected: No. 1789, *Ranunculus pubescens* Thunb. (RANUNCULACEAE), leaves trifoliolate, flowers small, yellow; 1790, *Senecio pellucidus* DC., leaves linear-oblancoate, dentate, glabrous, heads few, small, rays yellow; 1791, *Helichrysum undatum* Less. (COMPOSITAE), 3 ft., softly woolly all over, leaves obovate, large, heads densely corymbose with leafy bracts, involueral bracts white; 1794, *Helichrysum pallidum* DC. (COMPOSITAE), leaves lanceolate, 3-nerved, woolly below, setose above, heads closely glomerate, pale yellow; 1795, *Senecio adnatus* DC. (COMPOSITAE); herb 4 ft.; stem-leaves obovate, decurrent on the stem, entire; heads in a broad corymb, small, with few bracts; rays yellow; 1796, *Vernonia hirsuta* Sch. Bip. (COMPOSITAE), 2 ft., leaves sessile, oblong-lanceolate, subbullate, woolly below, heads purple; 1797, *Senecio hastulatus* Linn. (COMPOSITAE), basal leaves long-petiolate, sublyrate, upper auriculate at the base, heads few, rays pale yellow; 1798, *Silene capensis* Otto (CARYOPHYLLACEAE), puberulous all over, leaves lanceolate, subacute, flowers yellow; 1799, *Helichrysum umbraculigerum* Less. (COMPOSITAE), woolly, oblong stem leaves, and densely glomerate lemon-yellow small heads; 1800, *Gamolepis leiocarpa* Harv. (COMPOSITAE), leaves pinnatipartite, crowded, heads solitary, long-pedunculate, yellow; 1801, *Helichrysum acutatum* DC. (syns. *H. floccosum* Klatt; *H. eriophorum* Klatt; *H. Galpinii* Schltr. & Moeser, not N.E. Br.), densely and softly woolly, heads closely corymbose, yellow; 1802, *Helichrysum scapiforme* Moeser (COMPOSITAE), heads scapose, pink or white; 1805, *Vernonia natalensis* Sch. Bip. (COMPOSITAE), leaves lanceolate, strongly nerved, appressed-tomentose, heads purple; 1806, *V. hirsuta* Sch. Bip., leaves lanceolate, subcordate, bullate-reticulate, scabrid above, heads small, purple; 1807, *Eriosema salignum* E. Mey. (PAPILIONACEAE), stems short from a woody rhizome, leaves woolly below; flowers in short spikes, yellow and brown; 1808, *Scilla Baurii* Baker (LILIACEAE), leaves 1–2, ovate-lanceolate, racemes a little overtopping the leaves, flowers mauve-purple; 1809, 1811, *Cluytia hirsuta* E. Mey. (EUPHORBIACEAE), stems softly pubescent from a woody rhizome, leaves lanceolate, pubescent, flowers greenish; 1810, *Cluytia disceptata* Prain, habit similar, leaves broadly ovate, glabrous.

roadside, with hairy leaves and peduncles, and white or pale-pink flowers. A typical grassland plant of this south-eastern part of Africa was *Pentanisia prunelloides* (Klotzsch) Walp. (RUBIACEAE) (No. 1814), known in the *Flora Capensis* as *P. variabilis* Harv., the latter an apter name, but nowadays, with International Rules of Nomenclature at our elbow, we must not revert to R. A. Salisbury's practice of using any name we choose. It is a very variable plant. Another plant met with was *Lasiosiphon Kraussianus* Meisn. (THYMELAEACEAE) (No. 1815), the leaves and roots of which are poisonous and a great danger to livestock. This obnoxious plant is also very variable and has a wide range, being found as far north as French Guinea and the Eastern Sudan. I was interested to see growing *Oldenlandia amatymbica* O. Ktze. (RUBIACEAE) (No. 1816), stems almost leafless, flowers greyish-blue; *Aster filifolius* Vent. (COMPOSITAE) (No. 1822), a widely spread shrub with acicular leaves and small blue ray-flowers; and *Aster pleiocephalus* Hutch. (No. 1836), from a woody rhizome, leaves scabrid, narrowly lanceolate, rays blue. The other less outstanding plants collected near Mt. Currie are enumerated below.¹



Sandersonia aurantiaca Hook. (LILIACEAE), with orange-yellow flowers.

A, stamens and pistil; B, cross section of ovary.

¹ No. 1813, *Lithospermum papillosum* Thunb. (BORAGINACEAE), pilose all over, leaves oblong-lanceolate, flowers white; 1817, *Euphorbia striata* Thunb. (EUPHORBIACEAE), stems 1 ft., from a woody rhizome, leaves shortly and narrowly lanceolate, bracts broadly ovate, apiculate; 1818, *Asclepias multicaulis* Schltr. (ASCLEPIADACEAE), tuberous root, leaves lanceolate, cordate-hastate at the base; 1819, *Setaria nigrirostris* (Nees) Dur. & Schinz (GRAMINEAE), with club-shaped bristles; 1820, *Pachycarpus appendiculatus* E. Mey. (ASCLEPIADACEAE), 2-3 ft., leaves ovate-elliptic, apiculate, scabrid; flowers green; 1821, *Brachiaria serrata* Stapf (GRAMINEAE), short panicles of softly pubescent secund racemes; 1813, *Schizoglossum parvulum* Schltr. (ASCLEPIADACEAE), leaves linear, thinly pubescent; 1824, *Urginea rubella* Baker (LILIACEAE), with linear-filiform and slender racemes of white flowers streaked with brown; 1825, *Heliophila rigidiuscula* Sond. (CRUCIFERAE), 2 ft., leaves linear-acicular, flowers pale blue; 1826, *Helichrysum aureo-nitens* Sch. Bip. (COMPOSITAE), woolly, leaves oblanceolate, flower-heads small, glomerate, golden; 1827, *Pavetta tristis* Bremekamp (RUBIACEAE); 1828, *Protea Flanaganii* Phillips (PROTEACEAE); 1829, *Anthericum acutum* C. H. Wright (LILIACEAE), flowers greenish-white; 1830, *Scabiosa columbaria* Linn. (DIPSACACEAE), flowers white; 1831, *Alloterospis semialata* var. *Ecklonii* Stapf (GRAMINEAE), dark-purple glumes; 1833, *Scilla rigidifolia* Kunth (LILIACEAE), 9 ins., flowers greenish-white; 1835, *Acalypha punctata* Meisn. var. *longifolia* Prain (EUPHORBIACEAE), leaves oblong-lanceolate, denticulate, laxly gland-dotted below, male spikes pedunculate; 1837, *Eriosema cordatum* E. Mey. (PAPILIONACEAE), dwarf stems, leaflets narrowly elliptic, closely glandular below; 1838, *Eriosema Kraussianum* Meisn., leaves oblanceolate, thinly glandular.

We also botanised towards Sneezewood, and passed through Umzimkulu, a small place at the bottom of a steep descent. The next part of this day's journey was pure motoring, through Ixopo to Richmond, and then at last, on a fairly straight road to Maritzburg.

At Maritzburg I met for the first time the late Dr. J. W. Bews, then Professor of Botany and afterwards Principal of the Natal University College. With the arrival of Dr. Phillips and Dr. G. de Kock of the Veterinary Department, and of my colleague from Kew, Mr. (now Dr.) F. N. Howes, at his Natal home on leave, we formed quite a large party of botanists. It was interesting to see the well-equipped college with a very live botanical department. We also paid a visit to the veld nearby, where Dr. Bews showed us interesting stands of *Acacia Benthamiana*.

Later we paid a visit to the botanic gardens, very well cared for by Mr. H. H. Kidd,¹ formerly at Kew, but short of funds, like most such institutions in South Africa. It is a pity that this country, with its vast mineral wealth, has never produced a philanthropist interested in natural science who would help such places, as so many rich Americans have done in their country in the past. Botanical science in South Africa, especially for exploration work and publication, would greatly benefit if it had more help of this kind. The situation of the Maritzburg Botanic Garden is ideal for growing many plants, even Azaleas! The London Planes were very imposing, making fine shade trees. Growing on trees was a pretty little orchid with white flowers, *Mysticidium capense* (Linn. f.) Schltr. (1), No. 1839.

In the afternoon I met Dr. Warren at the Museum, which is very good zoologically, but at that time rather poor botanically, and then called on the veteran Dr. T. R. Sim, as keen as ever on botany. He was still making black-and-white drawings of Natal trees and shrubs. Dr. Sim is the author of several very useful books.

On Friday morning, 7th December, we started at 9.30 and reached Durban at one o'clock. The city was ablaze with the "Flamboyant", *Delonix regia* Raf. (CAESALPINIACEAE) (No. 1862). My time at Durban was mainly occupied with the despatch of dried and semi-dried specimens and with visits to the botanic garden and herbarium. I was much interested to see the place which the late Dr. Medley Wood created and in which he worked for so long. I found the herbarium very well cared for, and it contains a fine collection of Natal plants. It was then in charge of the mycologist, Dr. McClean, and Miss Forbes, the latter of whom since worked at Kew for a period. Research work at that time was largely devoted to problems connected with sugar-cane grown locally.

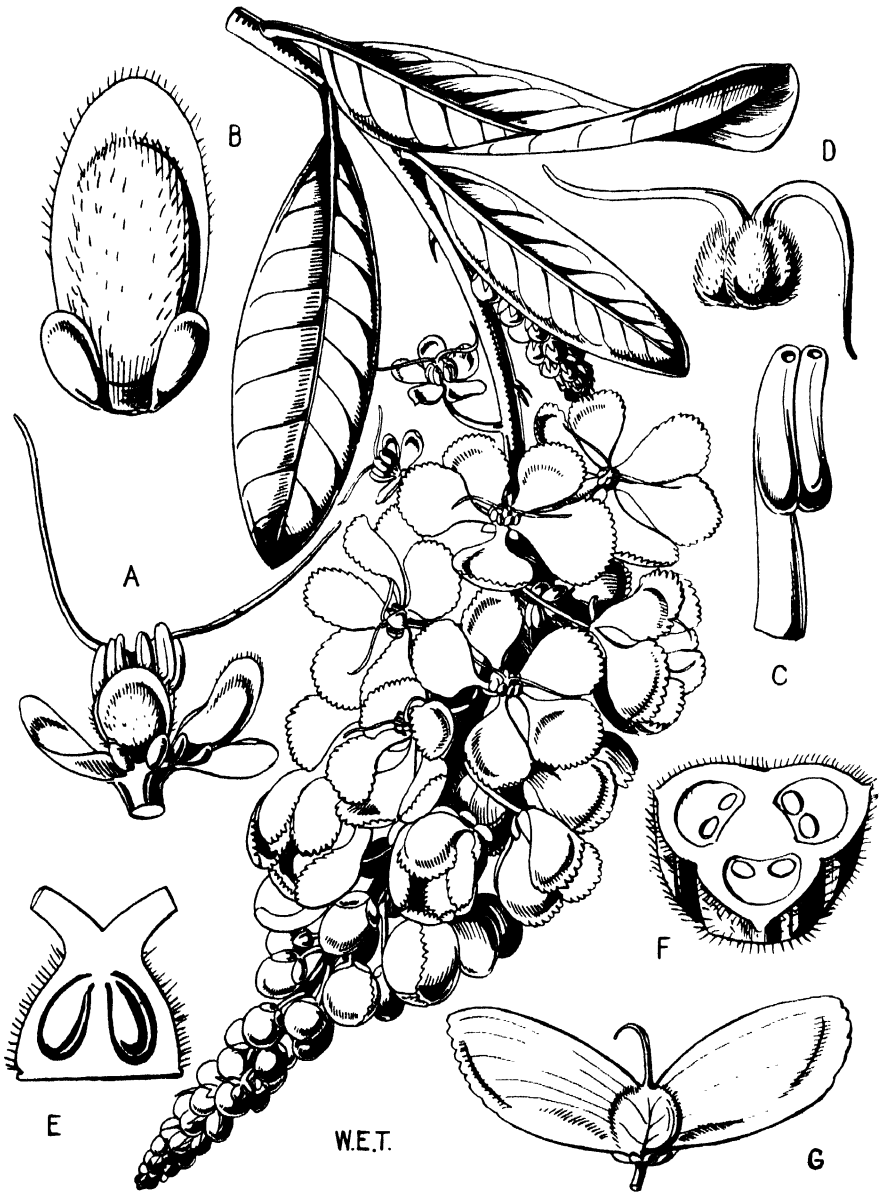
We made a short excursion to Umgeni,² a few miles to the north of

¹ Mr. Kidd died at Pietermaritzburg on 24th May, 1936 (*Kew Guild Journal*, 1937: 699).

² Collected at Umgeni: 1840, *Cussonia spicata* Thunb. (ARALIACEAE); tree 15 ft., leaves digitately compound, segments 3, with an obtriangular foliaceous wing on the petiole; spikes dense; No. 1841, *Lagynias lasiantha* (Sond.) Bullock (RUBIACEAE); shrub or tree 15 ft.; leaves narrowly elliptic, glaucous below; calyx-lobes long-spathulate, corolla green, pubescent, with filiform lobes; 1842, *Baphia racemosa* (Hochst.) Baker (PAPILIONACEAE), shrub 10 ft., leaves simple (unifoliolate), flowers white; 1843, *Acridocarpus natalitius* Juss. (MALPIGHIACEAE); climbing shrub, leaves oblong-elliptic, flowers yellow; 1844, *Calodendron capense* Thunb. (RUTACEAE), tree 40 ft., leaflets obovate, gland-dotted,

Durban, and next day I visited the Botanic Garden, which at that time seemed rather neglected as such. Few of the trees were labelled, and there was a general note of untidiness, which seemed a pity, after the life's work of Medley Wood. A well-kept garden would be an excellent memorial to this noteworthy South African botanist. I noted some fine trees from various parts of the tropics and subtropics, including a large specimen of *Ficus retusa* Linn., about 70 ft. high, with six main trunks from the base; *Aleurites triloba*, a large tree about 60 ft. high and 3½ ft. in diameter; *Grevillea robusta*, 80–90 ft. high, 4 ft. in diameter; *Araucaria excelsa* and *A. Bidwillii*, 90 ft. high; a striking tree of *Hura crepitans*, 30 ft. high, with closely prickly bark; *Castanospermum Cunninghamii*, 60 ft. high, 4 ft. in diameter, and loaded with blossom. I was much interested to see a fine specimen of *Drypetes natalensis* (EUPHORBIACEAE), with the flowers sessile in clusters on the main trunk and resembling tufts of moss.

petals linear, staminodes glanduliferous; 1845, *Secamone frutescens* Decne (ASCLEPIADACEAE), trailer, leaves narrow, flowers very small in axillary clusters; 1846, *Acalypha glabrata* Thunb. (EUPHORBIACEAE), tree, leaves ovate, crenate-dentate, nearly glabrous; inflorescence bisexual, with one female flower at the base enclosed by a dentate leafy bract; 1847, *Vangueria chartacea* Robyns (RUBIACEAE); shrub 6 ft., leaves oblong-lanceolate, glaucous-green below; cymes dichotomous, axillary, flowers green; 1848, *Homalium dentatum* Warb. (SAMYDACEAE); tree, leaves broadly elliptic, crenate-dentate; flowers in narrow panicles, smelling like those of the sweet chestnut.



Acridocarpus natalitius A. Juss. (MALPIGHIACEAE), collected at Umgeni, Natal.

A, flower; B, sepal with pair of glands; C, anther; D, pistil; E, vertical section of ovary; F, cross-section of ovary; G, fruit.

Chapter XIV

DURBAN TO PRETORIA

MR. DYER now returned by train to Grahamstown, and I was left alone to continue my journey. The next day, therefore (10th December), after collecting the car, the engine of which had been decarbonised during my stay, and transacting other business, I set off at 11.15 on my lonely trip to Pretoria. I had promised to arrive there by 15th December, to accompany General the Right Honourable J. C. Smuts on a trip to the Northern Transvaal.

I had met General Smuts at Mrs. Bolus' house at Claremont before I left the Cape Peninsula. A few years previously he had visited Kew, more particularly to meet the botanists who had been working on the *Flora Capensis*, and I then made his acquaintance. At Claremont he asked, "Would you care to accompany me on a trip to the Northern Transvaal; there will be room in one of the cars for yourself and botanical outfit?" Would I care to go! I planned there and then to so arrange my tour as to enable me to accompany one of South Africa's most famous men, whose exploits as a soldier had thrilled me as a boy, and whose scientific attainments had been an inspiration to me as a man. Would I go!

A trip to the Zoutpansberg would be like the realisation of a dream, and one I might have dreamed off and on for at least twenty years. For one of my first tasks on attaining a responsible position as a botanist had been to determine a collection of the woody plants made there by Mr. C. E. Legat, Conservator of Forests, and to see through the Press his interesting notes accompanying them. I was highly "intrigued" on that occasion over the determination of a woody plant with pinnate leaves and stipitate fruits, which baffled me, for I found similar specimens collected by Kirk on the Zambesi, and tucked away at the end of the SAPINDACEAE, to which it had been removed after a long rest in CAPPARIDACEAE. Some years later I was able to determine it as *Cordyla africana* Lour. (CAESALPINIACEAE), its flowers at last being collected, and giving away the secret of its true affinities. Surely it would be only fitting that I should collect specimens of this tree myself, which I am pleased to say I did on the banks of the Limpopo; and a noble tree it is.

In Durban I had received a telegram from Pretoria saying that the General was starting on the 14th December, which left me only four days for the journey. I would have liked to see more of the neighbourhood of Durban, for all around is the classical collecting ground of many botanists, such as Gerrard, McKen, Krauss, and Medley Wood.

I was alone for the first time in many weeks, and though I set off light-heartedly enough, I soon felt the absence of a companion, and it was a longish journey in three to four days for a little car with uncertain (or should it be *certain*) idiosyncrasies.

Although I had no idea of it then, I was destined to pass along this road again, some eighteen months later, on my return from a botanical

expedition to Rhodesia with General Smuts. So the chronological sequence of this narrative must be interrupted in order to preserve its geographical sequence and to give an account of a day's botanising in this region when I had the pleasure of accompanying Miss Forbes and Dr. McClean on a trip to Botha's Hill, about 20 miles along the Durban-Maritzburg road. Here on the 3rd September, 1930, there was a wealth of Natal spring flowers, which are arranged for the reader in systematic order, and perhaps from this list a botanist visiting the spot about the same date would be able to identify many of the species :—

Plants collected at Botha's Hill, Natal, 3rd September, 1930

LIGNOSAE (WOODY DICOTYLEDONS)

ROSACEAE—**Rubus rigidus** *Smith* (No. 4712): a bramble with pink flowers and hairy branches.

PAPILIONACEAE—**Crotalaria globifera** *E. Mey.* (No. 4716): on grassy banks; stems finely pubescent; leaves trifoliolate, leaflets oblanceolate; flowers yellow in close racemes; keel beaked. **Lotus discolor** *E. Mey.* (No. 4711): in young grass along the railway; stipules foliaceous like the oblanceolate leaflets; flowers creamy-white in long-pedunculate clusters with hairy pedicels. **Eriosema salignum** *E. Mey.* (No. 4720): stems short, in grass; stems appressed-silky; lower leaves simple, upper trifoliolate, narrowly obovate, sharply pointed, glabrous and reticulate above, densely silky below; flowers yellow, reflexed in short racemes; bracts nearly as long as the flowers. **Lotononis corymbosa** *Benth.* (No. 4670): dwarf, on hillsides; trifoliolate, leaflets obovate, thinly villous; flowers yellow, crowded in very short unilateral racemes; calyx and pedicels long-pilose. **Argyrolobium longifolium** *Walp.* (No. 4731): stems slender subsimple from a small carrot-like rootstock; leaves few, trifoliolate, leaflets linear, glabrous, about 3 cm. long; flowers yellow, solitary, shortly stalked; standard pubescent. **Indigofera hiliaris** *Eckl. & Zeyh.* (No. 4672): stems clustered and short from a woody rootstock; whole plant covered with silvery medifixed hairs; stipules very long and subulate; leaflets 3, oblanceolate, very acute; flowers crimson, in very short axillary racemes. **Rhynchosia nervosa** *Benth.* (No. 4715): trailer on grassy banks; leaflets 3, elliptic, mucronate; racemes zigzag, few-flowered; flowers yellow, the vexillum with brown markings; fruits softly villous.

ULMACEAE—**Trema bracteolata** *Blume* (No. 4677): tree; branches and leaves pubescent, the latter oblong-lanceolate, acuminate, crenate-serrate, about 7 cm. long and 2 cm. broad; flowers minute, in short axillary racemes.

CAPPARIDACEAE—**Maerua triphylla** *Dur. & Schinz* (No. 4664): in the valleys; shrub; leaves trifoliolate; leaflets lanceolate; flowers green and white, clustered; stamens numerous, filaments wavy; ovary long-stipitate.

POLYGALACEAE—**Polygala hottentotta** *Presl* (No. 4727): woody and almost leafless; leaves linear; flowers purple, small, racemose; sepals with membranous margins. **P. Ohlendorffiana** *Eckl. & Zeyh.* (No. 4719): dwarf from a woody stock; leaves ovate, pubescent; flowers purple; petals very veiny.

MALVACEAE—**Hibiscus gossypinus** *Thunb.* (No. 4689): a rusty-hairy shrub with ovate obtusely toothed leaves and white flowers; epicalyx of several acicular bracteoles two-thirds as long as the densely villous calyx.

EUPHORBIACEAE—**Acalypha peduncularis** *E. Mey.* (No. 4713): dwarf villous herb; leaves rounded to oblong, sharply toothed; male flowers in slender pedunculate spikes with spatulate ciliate bracts; females in a sessile cluster, with much-branched styles. **Cluytia cordata** *Bernh.* (No. 4704): stems simple from a woody rootstock, glabrous; leaves ovate-cordate, entire, glabrous, about 2.5 cm. long; flowers dioecious; males axillary, fasciculate; fruits globose, reticulate.

ERICACEAE—**Erica natalitia** *Bolus* (No. 4666): shrub; leaves very small; flowers minute, white tinged with red.

- HYPERICACEAE—**Hypericum aethiopicum** *Thunb.* (No. 4718): dwarf herb in new grass, from woody stock; leaves ovate, densely gland-dotted; flowers yellow; sepals elongate-lanceolate.
- SANTALACEAE—**Thesium natalense** *Sond.* (No. 4726): stems wiry, apparently leafless (but leaves much reduced); flowers green and white, in lax spikes; sepals bearded inside.
- CONNARACEAE—**Cnestis natalensis** *Planch. & Sond.* (No. 4651): shrub on rocky hillsides; leaves pinnate; leaflets oblong, oblique at the base, blunt at the apex, 2.5–3 cm. long, thinly pubescent below; flowers yellow, small, crowded in small panicles; sepals softly pubescent.
- LOGANIACEAE—**Buddleja pulchella** *N.E. Br.* (No. 4665): shrub; leaves opposite, ovate, entire, softly tomentose below; flowers orange and white, in close panicles.
- EHRETACEAE—**Ehretia hottentotica** *Burch.* (No. 4656): shrub with twisted branches; leaves obovate-orbicular, emarginate, pubescent; flowers purple, in small subsessile cymes; pedicels and calyx pubescent.
- ASCLEPIADACEAE—**Xysmalobium involucratum** *Dec.* (No. 4714): leaves linear, pubescent on the midrib and margins; flowers greenish, in small close umbels.
- RUBIACEAE—**Randia rudis** *E. Mey.* (No. 4668): shrub; leaves small and rounded-obovate, slightly pubescent; flowers solitary, sessile, creamy-white; calyx-tube puberulous, lobes rounded; corolla-tube about 5 mm. long.
- Tricalysia lanceolata** *K. Schum.* (No. 4654): shrub on hillsides; leaves lanceolate, obtuse, 8–10 cm. long, glabrous; flowers white, in small subsessile axillary cymules; corolla-lobes contorted.

HERBACEAE (HERBACEOUS DICOTYLEDONS)

- COMPOSITAE—**Vernonia hirsuta** *Schltr.* (No. 4706): stems erect, softly tomentose; leaves oblong, undulately toothed, softly tomentose below; flower-heads purple, in a small pedunculate corymb; involucre bracts apiculate.
- V. Kraussii** *Sch. Bip.* (No. 4705): stems short and simple from a woody rootstock; leaves ovate to nearly orbicular, entire, silky below; flowers purple, in small heads gathered into terminal clusters; involucre bracts acutely acuminate.
- Mikania capensis** *DC.* (No. 4657): climbing on tree in valleys; leaves ovate, widely cordate, acuminate, slightly pubescent and glandular below; flower-heads numerous, white; no rays; involucre bracts few, nearly glabrous.
- Aster asper** *Nees* (No. 4717): stems pilose from a woody rootstock; leaves lanceolate, shortly pilose; heads about 3 to each stem, long-pedunculate; rays blue.
- Helichrysum latifolium** *Less.* (No. 4698): basal leaves broad with parallel nerves, canescent below; corymbs head-like, flowers brownish-yellow.
- H. leiopodium** *DC.* (No. 4702): leaves linear, 3-nerved; heads in close corymbs; tips of involucre bracts yellow.
- H. Mundtii** *Harr.* (No. 4707): like the last but leaves broader and shorter, softly woolly below.
- H. undatum** *Less.* (No. 4708): leaves like the last, heads in a subglobose cluster with reddish bracts.
- Athrixia phylloides** *DC.* (No. 4652): a shrub on hill-sides with wiry branches; leaves oblong-lanceolate, acute, 1.5 cm. long, glabrous and coarsely reticulate above, densely woolly below; rays purple.
- Stoebe cinerea** *Thunb.* (No. 4669): leaves minute like a "heather"; flower-heads very small, in clusters gathered into large panicles; bracts woolly.
- Athanasia acerosa** *D. Dietr.* (No. 4662): branches thinly villous; leaves pinnatipartite into very narrow segments with acute points; flower-heads small, in very small corymbs; flowers yellow, discoid.
- Senecio erubescens** *Ait.* (No. 4699): leaves mostly radical, oblong-ob lanceolate, jagged-toothed; heads discoid, purple, more or less racemose; bracts scabrid.
- Gazania longiscapa** *DC.* (No. 4676): leaves radical, linear, entire, white-woolly below; peduncles and bracts bristly-pilose; rays bright yellow, with a red band below.
- Hieracium capense** *Lim.* (No. 4653): leaves radical, narrowly obovate, remotely dentate; heads laxly cymose, yellow.
- SOLANACEAE—**Lycium acutifolium** *E. Mey.* (No. 4667): a shrub with rigid spine-tipped angular branchlets, leaves very small, fasciculate; flowers solitary, pale lilac-white; pedicels 6 mm.; calyx cupular, dentate; corolla 8 mm. long.

- CONVOLVULACEAE—*Ipomoea crassipes* var. *thunbergioides* Hallier (No. 4673): prostrate among grass; leaves lanceolate, pilose; flowers solitary, purple; calyx-lobes nerved, 1.5 cm. long; corolla about 4 cm. long.
- SCROPHULARIACEAE—*Halleria lucida* Linn. (No. 4658): small tree; leaves opposite, ovate, crenate-serrate, acuminate, about 10×4.5 cm., glabrous; flowers orange-red, few in the leaf-axils; corolla curved, gibbous at the base, 3.5 cm. long, limb oblique; stamens 4; fruit a small purple berry.
- Sutera floribunda* O. Kuntze (No. 4649): a shrub; branches leafy; leaves opposite, broadly ovate, coarsely toothed, puberulous; flowers orange and mauve, in dense cymes; calyx hispid; corolla about 1 cm.
- Bopusia scabra* Presl (No. 4696): stems short from a woody stock; leaves coarsely lobulate-toothed, strigose on the nerves; flowers axillary, rose-pink; corolla funnel-shaped, 3 cm. long.
- Nemesia* sp. (No. 4697): herb; leaves opposite, obscurely toothed to entire; flowers mauve; pedicels shortly glandular-pubescent; corolla mauve, with a longish spur.
- DIPSACACEAE—*Scabiosa Columbaria* Linn. (No. 4695): herb with radical pinnatifid leaves and about 3.5 heads of pale-lilac hairy flowers.

MONOCOTYLEDONS

- ARACEAE—*Zantedeschia aethiopica* Spreng. (No. 4681): the common "Lily of the Nile", which scarcely needs description.
- IRIDACEAE—*Tritonia lineata* Ker. (No. 4693): among grass on hillside and bank near the railway; leaves ensiform, about 5-nerved; flowers pale yellow tinged with pink.
- HYPOXIDACEAE—*Hypoxis rigidula* Baker (No. 4679): leaves curved, long-pilose; flowers 2-3 together, yellow; *H. Gerrardii* Baker (No. 4700): smaller than preceding, with shorter leaves and more flowers, less pilose.
- ORCHIDACEAE—*Eulophia hians* Spreng. (No. 4701): leaves not present at flowering time; scapes with few distant spathaceous acute sheaths 3-3.5 cm. long; flowers purple to lilac, on pedicels about 2 cm. long; lip 3-lobed; spur up to 8 mm. long.
- E. Oliveriana* Bolus (No. 4721): leaves small at flowering time, ensiform, 2-nerved; scape with a few scarcely contiguous sheaths about 5 cm. long; flowers brown-green and yellow, rather crowded; lip 3-lobed; spur very short.
- Polystachya Ottoniana* Reichb. f. (No. 4655): epiphytic in crevices of rocks on hillsides; pseudobulbs about 2 cm. long; leaves broadly linear, obtuse, up to 15 cm. long; racemes few- (sometimes 1-) flowered; pedicels slender; flowers white and pale lilac.

Resuming my journey from Durban to the Transvaal in December 1928, I paused for early morning tea at Inchanga. From there I was somewhat awed at the wonderful view over the "valley of a thousand hills". Here surely must be many hundreds of miles untrodden by a botanist, and a sight of this country made me realise further how little we really know of the botany of some parts of South Africa. Nearly sixty years ago F. Oates travelled along this very road on his way to the Transvaal and Matabeleland and made a collection of plants, which were enumerated by R. A. Rolfe.¹

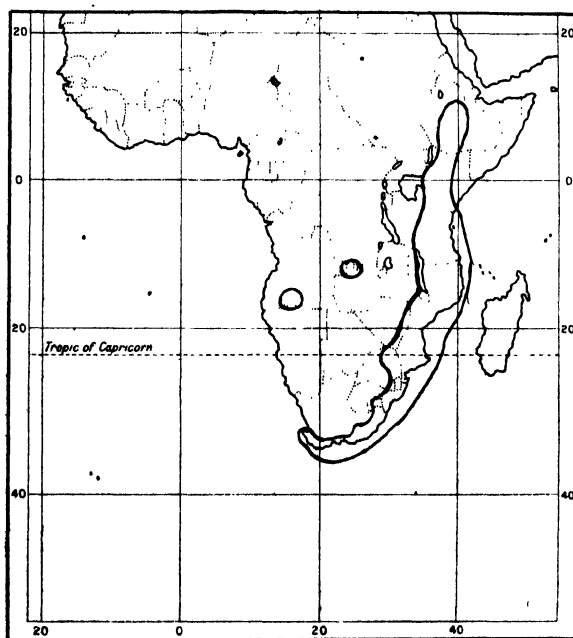
I speeded through Maritzburg as fast as possible, foregoing lunch, as I was considerably behind time, and I had a long and lonesome journey before me, with perhaps unforeseen trouble and very doubtful weather. Travelling alone, after the congenial companionship I had so far enjoyed, was rather a disturbing proposition, and I often found it necessary either to sing or whistle to pass the time and keep myself from getting drowsy—a very real danger when driving in a hot country. For the first part of the journey, however, I observed little worth collecting, though the country was very attractive, and reminiscent of parts of

¹ R. A. Rolfe in Oates, *Matabele Land and the Victoria Falls*, Ed. 2, Append. V (1889).



Halleria lucida Linn. (SCROPHULARIACEAE).

A, calyx, opened out; B, stamen; C, calyx and pistil; D, cross section of ovary.



Range of *Halleria lucida* Linn. (SCROPHULARIACEAE),
a woody genus also represented in Madagascar.

Wales—green, and here and there well wooded. The roads were fair, but there was far too much of the slippery light brown soil or “turf”, which is almost impassable during wet weather. I arrived safely at Mooi River at 5.30, and decided to stay the night, for the horizon ahead was dark with storm and the Drakensberg to the south-west looked gloomy and forbidding. Between Howick and Weston ¹ I had collected a few plants, including *Argyrolobium speciosum* Eckl. & Zeyh. (PAPILIONACEAE) (No. 1849), with large stipules, trifoliolate leaves (drying black), and racemes of flowers, the standard yellow, like the wings streaked outside with rich brown (very like an *Eriosema*); *Pelargonium aconitophyllum* var. *angustisectum* Kunth (GERANIACEAE) (No. 1850), with narrow digitately arranged leaf-segments, and umbels of dull pink flowers; *Eriosema cordatum* E. Mey. (PAPILIONACEAE) (No. 1851), leaflets elliptic, pubescent on the nerves and glandular below; peduncles elongated, flowers dull reddish-brown; *Rubus Ludwigii* Eckl. & Zeyh. (ROSACEAE) (No. 1852), dwarf; leaves pinnate, glabrous above, softly white-tomentellous below, petals pink.

Mooi River ² is not an inspiring place at which to stay, and I was glad to leave next morning as early as possible. Starting my engine at seven o'clock, I soon reached Estcourt and then Colenso, ³ great names to us in England during the Boer War. I lunched at Ladysmith, ⁴ and I was very curious to see the town of the famous siege. It was quiet enough during the midday heat.

¹ Also collected: No. 1853, *Lotononis eriantha* Benth. (PAPILIONACEAE), dwarf from a woody rootstock; stems long pilose; stipules leaf-like; flowers in short dense racemes, yellow; 1863, *Berkheya setifera* DC. (COMPOSITAE), 2½ ft., densely setose, heads yellow, very bristly; 1864, *Vernonia capensis* (Houtt.) Druce (COMPOSITAE), woody rhizome, leaves narrow, strongly nerved, heads purple; 1865, *Helichrysum rugulosum* Less. (COMPOSITAE), stems leafy, bracts pale silvery; 1866, *Polygala Rehmannii* Chod. (POLYGALACEAE), stems short, numerous, flowers deep purple, lateral petals green-veined; 1867, *Cyperus compactus* var. *flavissimus* (CYPERACEAE), head of yellow spikelets.

² Collected at Mooi River: No. 1854, *Indigofera rostrata* Bolus (syn. *I. frondosa* N.E. Br.), (PAPILIONACEAE), small dark purple flowers; 1855, *Vernonia Dregeana* Sch. Bip. (COMPOSITAE), nearly leafless, leaves linear, corymbs loose, flowers purple; 1856, *Callilepis Laureola* DC. (COMPOSITAE), leaves narrowly lanceolate, drying black, rays white, disk cone-shaped, dark purple; 1857, *Aster pleiocephalus* Hutch. (COMPOSITAE), scabrid, leaves 3-nerved, narrowly lanceolate, rays pale mauve; 1858, *Hesperantha Baurii* Baker (IRIDACEAE), about 1 ft. high, with one or two basal leaves 15–20 cm. and short open racemes of pink flowers; 1859, *Borreria natalensis* K. Schum. (RUBIACEAE), flowers white in axillary clusters.

³ Collected near Colenso: No. 1860, *Ceratotheca triloba* E. Mey. (PEDALIACEAE), 3 ft., leaves long-petiolate, ovate-triangular, dentate, flowers mauve; 1861, *Jasminum angulare* Vahl (OLEACEAE), low shrub, leaves trifoliolate, thinly pubescent; flowers white.

⁴ Near Ladysmith: No. 1868, *Haplocarpha scaposa* Harv. (COMPOSITAE), leaves basal, obovate, coarsely toothed, woolly below; 1869, *Senecio bupleuroides* DC. (COMPOSITAE), rootstock woolly at the top, leaves oblong, glabrous, entire, heads small, rays yellow; 1870, *Helichrysum miconiaefolium* DC. (COMPOSITAE), lower leaves with 3 parallel nerves, woolly below, flower-heads golden yellow, small, densely clustered; *Helichrysum agrostophilum* Klatt, leaves narrow, woolly below, scabrid and bullate above, bracts pale silvery, the heads densely corymbose; 1872, *Pelargonium aconitophyllum* var. *angustisectum* Kunth (GERANIACEAE) (see above); 1873, *Eulophia foliosa* Bolus (ORCHIDACEAE), flowers green with purple lip.



(Photogr.: W. L. Howes.)

Native life (Zulus). A typical grassland scene in the Natal High Veld.
Note the hut in course of construction with framework of saplings.

Excursion to the National Park and the Mont aux Sources

In order to conserve the geographical sequence of this narrative, I must again interrupt the story of my journey from Durban to Pretoria to give an account of a very interesting week spent in the National Park, and an ascent of the Mont aux Sources. I was able to do this through the kindness of Dr. I. B. Pole Evans on my return from Rhodesia in August 1930. He generously allowed my former colleague at Kew, Miss I. Verdoorn, assistant in the Pretoria herbarium, and Miss Forbes, from the Natal herbarium, to accompany me, and we enjoyed a week's botanising together, making our headquarters at the excellent hostel in the National Park.

From there we collected in the Tugela Gorge and made a memorable trip to the top of the Mont aux Sources (11,000 ft.), which we ascended



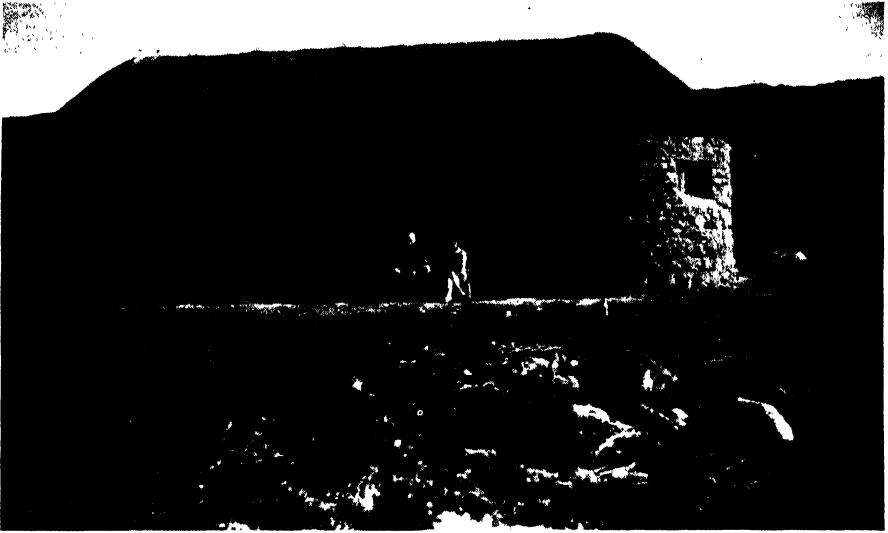
Mont aux Sources, Drakensberg.

[Photogr.: Miss H. Forbes.]

as far as possible on horseback. One cannot botanise very well from the saddle, particularly if one is more accustomed, as I am, to steering a motor-car. And I found these horses on hire from the hostel to be wily and tricky beasts, no less than their native attendants. For when about half-way up the steepest part of the ascent, I thought I might give my horse a little rest by proceeding on foot, and for a while I handed him over to the boy to lead. Imagine my chagrin, therefore, when a few minutes afterwards I found the boy comfortably seated on his back some half-mile or so farther up.

The horses were no less artful; for after rounding a bend we waited in vain for the second lady botanist to appear, and on going back found her horse had come to a dead stop as soon as the rest of the party had disappeared from sight.

From the point at which the horses could proceed no farther we climbed to the hut at the top by way of a very narrow gorge. We



[Photogr. : Miss H. Forbes.]

The rest house on top of the Mont aux Sources, Drakensberg.

stayed the night in the hut, where it was intensely cold, but we were amply repaid for this discomfort by the wonderful views at dawn and during sunrise next morning.

Our collection, made in the National Park at a somewhat unfavourable time of year, and after a very widespread fire, is enumerated below in systematic order.



[Photogr. : Miss H. Forbes.]

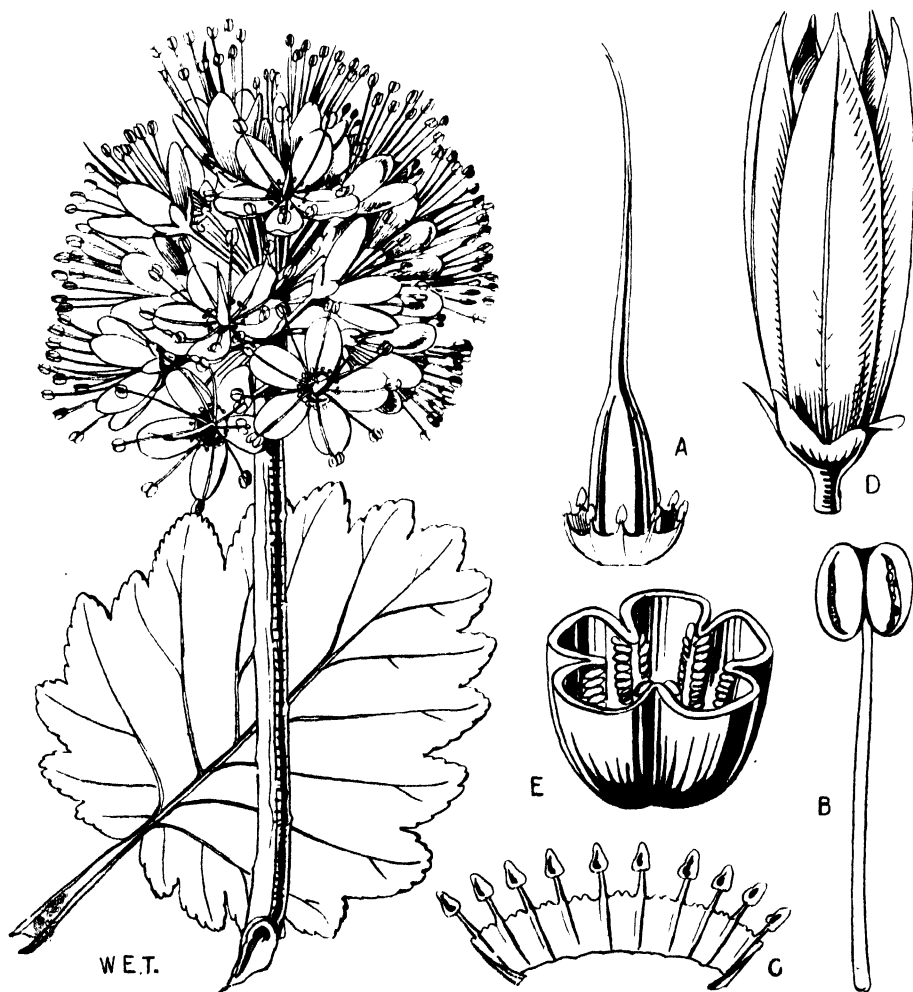
View in the early morning from the top of the Mont aux Sources, Drakensberg.

List of Plants Collected in the National Park, Natal, August, 1930

GYMNOSPERMS

CYCADACEAE - **Encephalartos Ghellinekii** Lem. (No. 4536): Tugela gorge; stems up to 2 m., the lower part covered with persistent leaf-bases; leaves up to 1 m. long, pinnate, with numerous very narrow pungent pointed segments; male cones sessile, females shortly stalked; habit that of a tree-fern; confined to Natal, from nearly sea-level up to 5000 ft.

TAXACEAE - **Podocarpus latifolia** R. Br. (No. 4488): a tree with broadly linear subglauous leaves and exposed bloom-covered seeds on a swollen stalk.



Greyia Sutherlandii Harv. (GREYIACEAE), from the National Park Natal; flowers red. Partly after Harv.

A, ovary; B, stamen; C, disk with gland-like appendages; D, fruit; E, cross-section of ovary.

LIGNOSAE (WOODY DICOTYLEDONS)

EBENACEAE—*Royena hirsuta* Linn. (No. 4483): shrub, in rocky ground; leaves narrowly oblanceolate, softly tomentellous all over; flowers axillary, nodding, port-wine red. *R. lucida* Linn. (No. 4507): stony ground in bush near stream, Tugela gorge; leaves oblong-elliptic, slightly pubescent; calyx campanulate, enclosing the fruit. *Euclea lanceolata* E. Mey. (No. 4489): tree, in rocky ground; leaves oblanceolate, with undulate margins; fruits very small, purple-black.

ROSACEAE—*Leucosidea sericea* Eckl. & Zeyh. (No. 4485): a shrub on rocky ground, common; branches covered with leaf-sheaths; leaves pinnate; leaflets plicately nerved, sharply toothed; flowers pale yellow, in short catkin-like terminal inflorescences. *Cliffortia repens* Schltr. (No. 4534): glabrous shrublet in rocky places; leaves acicular, acute, glabrous. *C. nitidula* (Engl.) R. E. & Th. Fries, var. *pilosa* H. Weim. (No. 4543): edge of bush near Tugela gorge; branches strigose; leaves oblanceolate, thinly pilose.



Laiosiphon Kraussianus Meisn. (THYMELAEACEAE), from the National Park; a species poisonous to stock.

A, flower-bud; B, calyx lobe; C, petal; D, flower; E, vertical section of flower; F, anthers; G, ovary and style.

PAPILIONACEAE—*Psoralea caffra* Eckl. & Zeyh. (No. 4510): edge of bush, near Tugela gorge; shrub with blue flowers arranged in dense oblong spikes; calyx villous; leaves trifoliolate, leaflets oblong-obovate, densely gland-dotted. *Eriosema Kraussianum* Meisn. (No. 4614): dwarf, in burnt ground here and there; trifoliolate, leaflets oblanceolate, minutely glandular below; stipules large, striate; flowers yellow, reflexed in short pedunculate spikes.

GREYIACEAE—*Greyia Sutherlandii* Hook. & Harv. (No. 4480): a shrub or small tree, with light porous wood; leaves like those of a currant bush; flowers red, in a short raceme.

SALICACEAE—*Salix capensis* Thunb. (No. 4617): small tree, edge of streams near hostel; leaves linear-lanceolate, very acute, finely toothed; catkins woolly.

MYRICACEAE—*Myrlea confiera* Burm. (No. 4622): bush on rocky ground near stream; leaves narrowly oblanceolate, tapered to the base, coarsely serrate, closely glandular below; berries small, glaucous, covered with wax.

MORACEAE—*Ficus Ingens* Miq. var. *tomentosa* Hutch. (No. 4642): a small tree on rocks; leaves ovate-elliptic, cordate at the base, obtusely pointed; figs subsessile, softly tomentose, the size of a pea.

FLACOURTIACEAE—*Kiggelaria africana* Linn. (No. 4542): small tree in bush near Tugela gorge, not in flower; leaves sharply dentate, oblong-lanceolate, about 8 by 2.5 cm. *Seolopia Mundii* Warb. (No. 4497): shrub in bush on rocky ground; leaves ovate, crenate-serrate, shining; not in flower. *Trimeria alnifolia* Planch. (No. 4521): small tree in bush of Tugela gorge; not in flower; leaves *Abnus*-like, suborbicular, repand-denticulate, cordate and 5-nerved at the base.

THYMELAEACEAE—*Lasiosiphon Kraussianus* Meisn. (No. 4607): in new growth on burnt ground, near hostel; stems simple, short, softly villous like the lanceolate leaves; flowers yellow, in heads surrounded by a few leafy 2-nerved bracts; petals one-third as large as the calyx-lobes. *L. polyanthus* Gilg (No. 4501): edge of bush near the Tugela gorge; like the last but stems more branched, flowers golden yellow; bracts 1-nerved, petals very small. *Passerina ericoides* Linn. (No. 4553): in rocky ground near Tugela gorge; stems softly tomentose, with very small appressed heath-like leaves; not in flower.

PROTEACEAE—*Protea Roupelliae* Miesn. (No. 4646): common on rocky ground; shrub; leaves crowded, oblanceolate, strongly nerved fringed with soft hairs especially towards the base; bracts deep pink, the inner spatulate and densely silky outside. *P. simplex* Phillips (No. 4567): common on mountain slopes, 7500–8000 ft.; leaves broader than above, faintly nerved; bracts glabrous.

PITTOSPORACEAE—*Pittosporum viridiflorum* Sims (No. 4486): a common tree on rocky ground, in fruit; leaves narrowly obovate, shortly pointed or emarginate; fruits clustered, opening into 2 broad valves with the seed in the middle and tipped by the persistent style.

POLYGALACEAE—*Muraltia saxicola* Chod. (No. 4563): edge of path up the mountain, about 7000 ft.; shrublet; leaves crowded, oblong-oblanceolate, with sharp recurved points; flowers purple, axillary.

MALVACEAE—*Sphaeralcea pannosa* Bolus (No. 4499): shrub near Tugela gorge; stellate-tomentellous all over; leaves 5-lobed, the terminal lobe the largest, coarsely crenate; flowers solitary, long-stalked, rosy pink.

EUPHORBIACEAE—*Acalypha punctata* Meisn. (No. 4518): in grass near Tugela gorge; stems short from a rhizome; leaves subsessile, ovate-lanceolate, serrate, densely punctate-glandular; male spikes red, axillary, shortly pedunculate; female flowers solitary, terminal, red. *A. depressinervia* K. Schum. (No. 4610): habit of the last, but leaves narrowly lanceolate, entire, long-villous; male spikes reddish, long-pedunculate; female solitary, terminal, red. *A. peduncularis* E. Mey. (No. 4648): in burnt grass *Cluytia Katherinae* Pax (No. 4555): in bush, near Tugela gorge; stems pilose; leaves oblong-lanceolate, entire, with markedly recurved margins, glaucous below and thinly pilose, up to 6 cm. long and 1.5 cm. broad; flowers greenish, subsessile, males clustered in the leaf-axils, females solitary; fruits densely villous. *C. monticola* S. Moore (No. 4490): like the last but glabrous and flowers on slender pedicels. *Euphorbia epicyparissias* E. Mey. (No. 4504): edge of bush near Tugela gorge; stems rough with scars of fallen leaves; leaves crowded, sessile, linear, auriculate at the base; involucres with broad leafy green bracts. *E. Gueinzii* Boiss. var. *albovillosa* N.E. Br. (No. 4639); leaves lanceolate, softly villous; fruits villous.

ERICACEAE—On top of Mont aux Sources, 11,000 ft.: *Erica frigida* Bolus (Nos. 4572, 4581): leaves short, setose; flowers pink. *E. drakensbergensis* Guthrie & Bolus (No. 4595): leaves very small, closely appressed, ciliate on the margin; flowers very small, red. *E. algida* Bolus (No. 4577): leaves slightly muricate; flowers pink, corolla minutely tomentellous.

In the Tugela Gorge, at lower altitudes: *Erica cafferorum* Bolus (No. 4496): leaves minutely scaberulous on the margin; branchlets softly puberulous; flowers pink; sepals bract-like. *E. natalitia* Bolus (No. 4559): intricately branched; leaves very small, glabrous; flowers very small, globose, white and pink. *Philippia Evansii* N.E. Br. (No. 4514): like the last but flowers all white.

OLINIACEAE—*Olinia acuminata* Klotzsch. (No. 4494): tree in rocky ground near streams, in fruit; branchlets quadrangular; leaves opposite, oblanceolate, very obtuse, with thin margins; fruits scarlet, the size of a pea.

AQUIFOLLIACEAE—*Ilex mitis* Radlk. (No. 4548): small tree in bush near Tugela gorge; leaves entire or nearly so, oblong, acuminate.

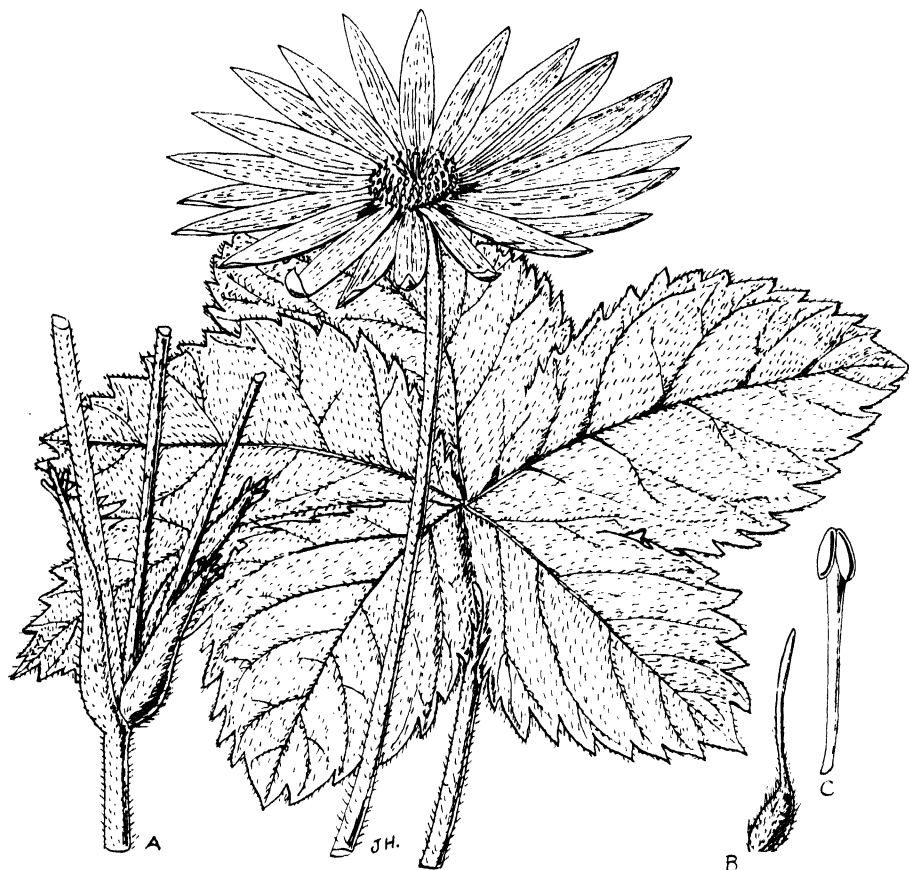
- CELASTRACEAE**—*Cassine velutina* Loesn. (Nos. 4547, 4627): in bush in Tugela gorge; branches and midrib of the ovate-lanceolate denticulate leaves softly pilose; flowers few on slender axillary peduncles; capsule opening by two boat-shaped valves; seeds black. *Cassinopsis capensis* Sond. (No. 4541): in bush near Tugela gorge; branchlets armed with extra-axillary spines; leaves subopposite, ovate, entire, small.
- SANTALACEAE**—*Osyris abyssinica* Hochst. (No. 4487): shrub, in bush near stream; leaves broadly lanceolate, sharply pointed; flowers greenish, few on axillary peduncles. *Thesium angulosum* A. DC. (No. 4554): stems and branches winged; leaves much reduced and subulate. *T. nigrum* A. W. Hill (No. 4576): on rocks on mountain slopes near caves, 9000–10,000 ft.; densely tufted; leaves well developed; flowers green. *T. sclerpioides* A. W. Hill (No. 4618): in grass near hostel; stems and branches terete, resembling an *Ephedra*; leaves quite reduced.
- RHAMNACEAE**—*Rhamnus prinoides* L'Herit. (No. 4493): small tree in rocky ground near streams; leaves broadly lanceolate, crenulate but entire towards the base; flowers axillary, solitary; fruits grooved, globose. *Phyllica Thodel* Phillips (No. 4546): shrublet with densely leafy branches; leaves lanceolate, scarcely 1 cm. long, with recurved margins hairy below; flowers in heads covered with white hairs.
- MYRSINACEAE**—*Myrsine africana* Linn. (No. 4538): Tugela gorge; leaves small, obovate, toothed in the upper half, gland-dotted below; fruits purple-black. *Rapanea melanophlebos* Mez (No. 4545): leaves oblanceolate, entire; flowers greenish, in axillary clusters.
- ARALIACEAE**—*Cussonia paniculata* Eck. & Zeyh. (No. 4637): spikes in panicles; leaves peltate-digitate; leaflets 7–9, mostly deeply lobed. *C. spicata* Thunb. (No. 4638): spikes simple; leaflets deeply lobed in the upper part or entire.
- ANACARDIACEAE**—*Rhus obovata* Sond. (No. 4508): in bush near Tugela gorge; leaves trifoliolate, leaflets broadly oblanceolate, narrowed to the base, entire or with one or two large teeth, paler and softly tomentellous below; flowers minute, in terminal hairy panicles.
- LOGANIACEAE**—*Buddleia salvifolia* Lam. (No. 4484): common shrub in rocky ground; leaves lanceolate, cordate at the base, crenulate, bullate, tomentose below; flowers numerous, dense, white-lilac.
- APOCYNACEAE**—*Carissa arduina* Lam. (No. 4549): hillside near cave, Tugela gorge; leaves ovate, acute; spines forked; fruit scarlet.
- ASCLEPIADACEAE**—*Asclepias cucullata* Schltr. (No. 4629): in grass near hostel, leaves linear; flowers 3–4 in umbels, greenish-brown.
- RUBIACEAE**—*Burchellia bubalina* (Linn. f.) Sims (No. 4625): rocky ground near stream, small tree; flowers scarlet. *Oldenlandia amatymbica* O. Kuntze (No. 4647): in grass near hostel; leaves reduced, very narrow; flowers subumbellate, white. *O. natalensis* O. Kuntze (No. 4626): leaves lanceolate; flowers blue, subcorymbose. *Pentanisia prunelloides* (Klotzsch) Walp. (*P. variabilis* Harv.) (No. 4602): leaves narrowly linear-oblanceolate, acute; flowers blue; calyx-lobes foliaceous, unequal. *Galopina circaeoides* Thunb. (No. 4560): graceful plant among grass; leaves petiolate, lanceolate, acute; flowers very small, in large much-branched panicles. *Anthospermum* sp. (No. 4583): dwarf and very woody; densely leafy; leaves ericoid, shortly pubescent.

HERBACEAE (HERBACEOUS DICOTYLEDONS)

- RANUNCULACEAE**—*Anemone Fanninli* Harv. (No. 4515): on road to Tugela gorge; leaves long-stalked, suborbicular in outline, digitately 7–8-lobed to one-third or nearly half the blade, lobes dentate, silky-villous below; flowers, 6 cm. diam., with numerous narrow petaloid white sepals.
- GENTIANACEAE**—*Sebaea Schinziana* Gilg (No. 4540): Tugela gorge, in moist places; lanky herb; stems narrowly winged; leaves opposite, ovate-rounded, mucronate, 5-nerved; flowers yellow, corymbose. *S. Thomasii* Schinz (No. 4562): edge of stream about 7000 ft.; dwarf; leaves obovate-rounded, 3-nerved; flowers few, yellow, subsessile, the corolla like a Jasmine. *S. procumbens* A. W. Hill (No. 4574): mountain-side, on rocks about 10,000 ft.; caespitose; leaves spathulate-obovate; flowers cymose, yellow.

LOBELIACEAE—**Lobelia Preslii** A. DC. (No. 4556): near water in the Tugela gorge; leaves reniform, obtusely lobulate; flowers few, pale blue.

COMPOSITAE—**Aster asper** Nees. (No. 4603): among grass near hostel; leaves linear, scabrid-pilose; rays blue. **A. perfoliatus** Oliv. (No. 4564): hillsides near path up mountain; leaves amplexicaul, ovate, strongly nerved; rays blue. **A. natalensis** Harv. (No. 4565): in grass on mountain slopes, about 7000–8000 ft.; leaves radical, oblanceolate, hispid; stem leaves few and linear; rays blue, disk yellow. **A. filifolius** Vent. (No. 4517): shrub with



Anemone Fanninii Harv. (RANUNCULACEAE); flowers white.

A, portion of scape showing the involucre; B, carpel; C, stamen.

short branchlets, filiform leaves; rays blue. **Pentzia Cooperi** Harv. (No. 4575): slopes of mountain, in rocky places, 9000–10,000 ft.; leaves trifid at the apex, woolly; heads small, laxly corymbose. **Chrysocoma tenuifolia** Berg. (No. 4566): rocky places and along pathways, 8000–10,000 ft.; shrublet, densely clothed with sticky acicular leaves; heads discoid, yellow.

Helichrysum: the rather numerous species collected may be grouped as follows:—

A. Bracts yellow or straw-coloured. B. Heads solitary: **H. fulgidum** Willd. (No. 4633): on burnt ground; mature leaves glandular-pubescent, only the young ones woolly on the margins; heads 2.5 cm. diam. **H. sp.** (No. 4544): lower leaves densely white-woolly, 3-nerved; heads 4 cm. diam. B.B. Heads crowded: C. Leaves short, small and narrow, very crowded on the branches. **H. sp.** (No. 4570): rocky ground near caves, 9000–

10,000 ft.; leaves viscid, glabrous above, with 3 parallel nerves; heads few, in sessile corymbs. **H. trilineatum** DC. (No. 4599): slopes and top of Mont aux Sources, 8000–11,000 ft.; small shrub in rocky ground; leaves oblong, woolly, parallel-nerved; heads in sessile clusters. **H. infaustum** Wood & Evans (No. 4643): among grass; leaves narrow, woolly; heads very small, closely set in small branched corymbs. **C.C.** Leaves not small and not narrow, or if narrow then longish. **D.** Leaves broadly oblanceolate, with prominent parallel nerves, white-tomentose below; heads straw-coloured, crowded into a small globose head. **H. latifolium** Less. (No. 4608): in young grass on burnt ground. **D.D.** Leaves not or only faintly nerved. **E.** Lower altitude plants near Tugela gorge. **F.** Heads not united into a mass. **H. floccosum** Klatt (No. 4644): bracts woolly; leaves fairly large. **H. lanatum** Harv. (No. 4613): bracts glabrous; leaves smallish. **H. sp.** (No. 4551): bracts woolly; leaves small, spatulate. **F.F.** Heads agglutinated into a mass; leaves woolly. **H. umbraculigerum** Less. (No. 4620): common among grass. **E.E.** Top of Mont aux Sources, 11,000 ft. **H. subglomeratum** Less. (Nos. 4587, 4593): leaves linear, silvery, with recurved margins. **H. alticola** Bolus var. **montanum** (No. 4598): leaves spatulate-obovate, woolly. **A.A.** Bracts white or pink. **G.** Heads very small and numerous in a close corymb; leaves obovate-oblanceolate, softly tomentose all over. **H. Sutherlandii** Harv. (No. 4550): Tugela gorge. **G.G.** Heads solitary or few. **H.** Leaves small and ericoid; heads very small and white. **H. caespititium** Sond. (No. 4641): on rocks. **H.H.** Leaves not ericoid. **I.** Heads much longer than broad; bracts pink, the inner white; leaves with a silvery vellum. **H. retortoides** N.E. Br. (No. 4569): in rocky ground at top and on sides of Mont aux Sources, 9000–11,000 ft. **I.I.** Heads not longer than broad or only slightly so. **J.** Heads on leafy peduncles; plants of lower altitudes: **H. marginatum** DC. (No. 4578): leaves woolly only on the margins; mountain slopes about 10,000 ft. **H. adenocarpum** DC. (No. 4557): in Tugela gorge and on mountain slopes, leaves densely long-woolly all over; bracts pink and white. **H. chionosphaerum** DC. (No. 4561): among rocks and along ledge of path up the mountains; leaves hairy on the very distinct parallel nerves below; bracts white. **J.J.** Heads sessile or subsessile; cushion or very dwarf plants from the highest altitudes. **K.** Heads large, about 2.5 cm. diam. and in length; leaves glabrous above; bracts pink. **H. sp.** (No. 4573): **K.K.** **H. confertum** N.E. Br. (No. 4597): indumentum vellum-like.

Metalasia muricata Less. (No. 4503): in grass near Tugela gorge; heads small, densely glomerate, white. **Athrixia phyllicoides** DC. (No. 4619): rocky ground near stream; leaves loosely arranged, lanceolate, acute, woolly below; heads purple. **A. pinifolia** N.E. Br. (No. 4616): rocky ground near stream; leaves crowded, acicular, spinulose on the margin; rays white above, lavender tinted below. **Printzia pyrifolia** Less. (No. 4516): open hillsides in Tugela gorge; shrub; leaves rounded-ovate, denticulate, glabrous above, tomentose below; heads purple, sessile. **Eumorphia sericea** Wood & Evans (No. 4596): on mountain top; densely and softly tomentose shrublet; leaves tufted, ericoid; part flowering. **Athanasia montana** Wood & Evans (No. 4509): near Tugela gorge; erect shrublet, densely leafy; leaves sessile, ovate, coarsely toothed, closely gland-dotted; heads densely corymbose, covered with paleae on the receptacle. **A. acerosa** D. Dietr. (No. 4505): near Tugela gorge; leaves divided into filiform segments, pilose; heads small, few, corymbose. **Cenia hispida** Harv. (No. 4592): rocky ground on slopes of the mountain at 10,000 ft.; leaves radical, pinnately divided, woolly; scape leafless. **Artemisia afra** Jacq. (No. 4535): amongst bush on road to Tugela gorge; leaves bipinnately finely cut, woolly below; heads small, in panicles. **Cineraria montana** Bolus (No. 4537): leaves pinnately partite, segments oblong lanceolate, woolly below. **Senecio Burchellii** DC. (No. 4635) (see p. 139). **S. seminivea** Wood & Evans (No. 4584): shrublet with rooting branches, on top of Mont aux Sources; leaves pinnately partite into fine segments; innovations very woolly; involucrel bracts glandular-hispidulous outside. **Othonna scapigera** Harv. (No. 4579): rocky ground, top of Mont aux Sources; roots very thick; leaves small, spatulate, glabrous;

scape leafless, past flowering. *Osteospermum moniliferum* Linn. (No. 4500): in open ground on road to Tugela gorge. *Berkheya setifera* DC. (No. 4605): bank near stream; leaves setose-pilose, obovate, repand-dentate; flower-heads few, yellow. *B. sp.* (No. 4568): on rocky slopes near the gap, 7500–8000 ft.; shrubby, with tufts of oblanceolate spinous-toothed leaves woolly below; peduncles elongated; bracts spinous-toothed. *Gerbera ambigua* Sch. Bip. (No. 4512): herb on open hill-sides near the gorge; leaves oblong-oblanceolate, white-woolly below; flower-heads yellow. *G. plantaginea* Harv. (No. 4631): among grass, similar to preceding but leaves only thinly pilose below; rays white above, red below. *Crepis polypoda* Phillips (No. 4630): bracts setose. *Lactuca capensis* Thunb. (No. 4632): in grass, pale lilac.

CRASSULACEAE—*Crassula setulosa* Harv. var. *curta* Schönl. (No. 4585): on rocks at top of Mont aux Sources, 11,000 ft.; densely tufted and very dwarf; leaves setose-ciliate towards the base, reddish. *C. transvaalensis* O. Kuntze (No. 4640): on rocks near hostel; habit of a *Selaginella*, glabrous; flowers very small, axillary. *Kalanchoe thyrsiflora* Harv. (No. 4645): in crevices of rocks; leaves fleshy, obovate-orbicular; flowers yellow, crowded in a dense narrow oblong panicle; corolla 1.5 cm. long.

SOLANACEAE—*Solanum aculeatissimum* Jacq. (No. 4552): in bush near Tugela gorge; stems with numerous sharp spreading prickles; fruits the size of a small tomato.

SCROPHULARIACEAE—*Halleria lucida* Linn. (No. 4482): rocky ground, near streams; small tree; leaves opposite, ovate, acuminate, dentate; flowers very zygomorphic, on the older parts of the shoots, orange-red (see figure, p. 275). *Bowkeria triphylla* Harv. (No. 4498): with the last; leaves mostly 3 in verticils, oblong-lanceolate, pubescent on the nerves below; fruit 3-valved. *Phygelius capensis* E. Mey. (No. 4525): undershrub at edge of bush in Tugela gorge; leaves long-petiolate, ovate, doubly crenate; not in flower. *Nemesia foetens* Vent. (No. 4606): cultivated ground near hostel; flowers pink, with yellow spur; *N. albiflora* N.E. Br. (No. 4539): moist places in Tugela gorge; flowers white. *Buchnera dura* Benth. (No. 4621): in grass near hostel; drying black; flowers dark blue.

DIPSACACEAE—*Cephalaria ustulata* Roem. & Schult. (No. 4533): rocky places usually near water in Tugela gorge; leaves pinnately partite, petioles reflexed-pilose.

SELAGINACEAE—*Selago monticola* Wood & Evans (No. 4513): rocky ground near Tugela gorge; leaves linear-oblong, scabrid; flowers subcapitate, white. *Hebenstreitia polystachya* Harv. (No. 4506): leaves linear, serrulate; flowers spicate, white and orange.

ACANTHACEAE—*Barleria ovata* E. Mey. (No. 4491): leaves ovate-lanceolate, densely pilose on the nerves; flowers purple. *Adhatoda natalensis* Nees (No. 4615): dwarf, in burnt ground; leaves narrowly lanceolate, small, glabrous; flowers white.

GERANIACEAE—*Pelargonium Bowkeri* Harv. (No. 4628): on dry stony banks; leaves elongated and *Artemisia*-like, pinnately much cut into fine segments, thinly pilose; flowers greenish-yellow and pink, 5–10 in an umbel; pedicels, calyx and fruit softly pubescent.

LABIATAE—*Beclium obovatum* N.E. Br. (No. 4604): flowers capitate, lilac; calyx ciliate. *Orthosiphon stenophyllus* Gürke (No. 4530): in bush near Tugela gorge; leaves silvery-tomentellous; flowers verticillate. *Leonotis* (No. 4523): leaves coarsely toothed; flowers orange, capitate; calyx-teeth subulate.

MONOCOTYLEDONS

LILIACEAE—*Scilla lanceifolia* Baker (No. 4609): in new grass on burnt ground; flowers green and purple. *Asparagus medioloides* Thunb. (No. 4511): habit of a *Smilax*; creeper in bush, near Tugela gorge; cladodes leaf-like; flowers white, banded with greenish-purple. *A. africanus* Lam. (No. 4520): near Tugela gorge; prickly; cladodes acicular. *A. virgatus* Baker (No. 4636): in grass and rocky ground, common; cladodes filiform; flowers white; not prickly.

- AMARYLLIDACEAE—*Anoiganthus breviflorus* Baker (No. 4612): in burnt ground; flowers yellow.
- IRIDACEAE—*Moraea natalensis* Baker (No. 4600): mountain slopes, 8000–9000 ft.; in grass; flowers purple. *M. sp.* (No. 4601): similar but flowers white, veined with blue. *M. spathacea* Ker. (No. 4481): near water, flowers yellow, Iris-like. *Tritonia lineata* Ker. (No. 4492): flowers yellow, in grass on stony slopes.
- HYPOXIDACEAE—*Hypoxis* sp. (No. 4611): dwarf in new grass on burnt ground; flowers yellow.
- GRAMINEAE—*Arundinaria tessellata* Munro (No. 4532): the “Berg Bamboo”, moist places near stream, Tugela gorge. *Danthonia disticha* Nees (No. 4590): top of Mont aux Sources; inflorescence a thick spike. *Koeleria cristata* Pers. (No. 4589): top of Mont aux Sources; inflorescence a narrow panicle. *Pentastichis natalensis* Stapf (No. 4588): top of Mont aux Sources; inflorescence a broad pyramidal panicle.

Again resuming the story of my journey from Durban to Pretoria in December 1928 (p. 272), I found the roads beyond Ladysmith were in a very bad state and when “28 miles from Newcastle” I ran into a terrific thunderstorm whilst still on the treacherous “brown turf”. I was compelled to stop and wait with enforced patience for quite an hour, during which the lightning played around the little car, thunder reverberated through the mountains, and the landscape and road soon disappeared in the deluge. At length, after a spluttering start on the part of the engine, I proceeded in low gear on a course now more like a river than a road, balancing the vehicle precariously on the camber, sometimes “proceeding” almost sideways, at others making progress backwards. Once I glided completely off the road, and got back to it only by reversing the engine, the reverse gear apparently striking a happy medium between low and second. Newcastle at last, and a very different Newcastle from the one I know so well in the North of England; but a comfortable hotel, and after a hot bath, the disturbing experience of the storm, the roads, etc., soon assumed their proper perspective.

Next morning I started early, in preparation for a longish day, for I hoped soon to enter the Transvaal and see at last the High Veld. Beyond Newcastle there are several stiff climbs, and I stopped occasionally to cool the engine. Once I came across a Ford car doing likewise, its owner a friendly clergyman, an Irishman, and much interested in my outfit. Later he caught me up when I was collecting at the foot of a large hill. He climbed out of his car and said I might like to know, being an Englishman, that I was on Majuba. MAJUBA! I stopped on some flat country between Majuba and Volksrust to dig up the tuber of a brilliant red *Erythrina*, a task which I much under-estimated, having only an old bayonet for the work. After half an hour's toil a burly native sauntered up and took over the task, which he soon accomplished, and was highly pleased with the sixpence I gave him as reward. This beautiful *Erythrina* is *E. Zeyheri* Harv. (PAPILIONACEAE), and one comes across occasional clumps of it on the side of the hills near the road approaching the Transvaal border.

At Volksrust one seems to enter a new world, the Transvaal High Veld, a part of the country with tolerably good roads and plenty of grass, but no trees to speak of. And the vista was miles and miles of undulating veld, with here and there a sentinel peak to break the landscape. And the sky! Thousands of little white clouds diminishing into the far distance fifty to sixty miles away. Somehow I felt much more at home in the Transvaal.

At a rattling good pace, the engine literally singing a tune—for I had no time to stop and collect—I bowled along into Standerton, where I stayed an hour for rest and refreshment. Heidelberg was approached about six o'clock, but on a hill just short of the town I stopped to overhaul my presses and label up some of the specimens. Whilst so engaged, and struggling desperately with drying-papers blowing about in the wind—which always seems to spring up when one starts this particular job—a cape-cart stopped near me and two young men gazed wonderingly at my impedimenta, the car covered with dust, myself likewise. They quickly grasped the idea, and assisted me in changing and labelling the specimens. I mention this particular incident because it serves to illustrate the warm friendliness and interest the average South African takes in the visitor from overseas. They were keenly interested to hear about the activities of the Royal Botanic Gardens, Kew, particularly of the wonderful collection of dried plants preserved therein. They advised me as to the better hotel to stay in at Heidelberg, after expressing regret that, owing to their parents being away, they could not ask me to be their guest! Nor did the hospitality of those young men stop at that, for later they came and routed me out of the hotel and insisted on my accompanying them to the local cinema at their expense!

Next morning I arrived at Johannesburg at 10.30, where I replenished my stock of films, and then proceeded to Pretoria by a splendid trunk road, reaching the capital at midday. In the afternoon I paid a visit to the National Herbarium, and again met Dr. E. P. Phillips, the senior botanist, Miss Verdoorn, formerly at Kew for a period, and Dr. Doidge and others. I was much interested to see this comparatively new department, which at the time of my visit was called the Division of Botany, but has since been renamed the Division of Plant Industry.

Taxonomic work, however, is considerably handicapped, because the Herbarium is comparatively modern, and contains very few type specimens. To make it more efficient it would be necessary for every species represented in it to be taken to Kew and other European herbaria and compared with type specimens. I trust that my own collection, which has been dealt with in this way and a set presented to the National Herbarium on behalf of Kew, will in a small way help to remedy this deficiency.

The mycological section of the department has done very valuable work in relation to agriculture and fruit-growing, the Chief of the Division, Dr. I. B. Pole Evans, C.M.G.,¹ being a mycologist. South Africa has been fortunate for a decade in having had at the head of its botanical department a chief with so much energy and organising ability. During recent years great progress in botanical science has

¹ Dr. Pole Evans retired in September, 1939.

been made under his leadership. At the time of my visit not only had he charge of the Botanical Survey, but he was also head of the Horticultural and Entomological branches and of Field Husbandry.

The botanical section is centred at the National Herbarium, Union Buildings, Pretoria, and deals with all botanical problems, including plant diseases and questions relating to fruit export. The objects of the Botanical Survey instituted by the department are to record the geographical distribution of plants in the Union of South Africa; to study climatic factors which determine the distribution of species and the formation of distinct types of vegetation in the Union; to protect, develop, improve and maintain the indigenous vegetation in order to prevent soil erosion and counteract the results of overstocking.

The research activities of the Survey are supervised by the Director in collaboration with a committee of four regional botanists, who, with the chief Conservator of Forests, the Director of Veterinary Services, and the Senior Botanist in charge of the National Herbarium, form the Botanical Survey Committee.

Under the auspices of the Botanical Survey, directed by Pole Evans, a number of very important papers have been published.

Memoir No. 4, *A Guide to Botanical Survey Work*, contributed to by several writers, is a valuable introduction to field and taxonomic botany in South Africa, and includes a list of South African botanical literature by S. Schönland.

Dr. Galpin's papers are important contributions by one with much experience in the field, whilst the mantle of the late Dr. Guppy has fallen, and fits well, on the shoulders of Dr. J. Muir in the study of drift-seeds.

As a taxonomist particularly interested in plant distribution, the writer hopes that a proportion at least of future Memoirs will be devoted to regional floras or lists of plants occurring in the smaller phyto-geographical areas in which South Africa abounds.

Memoir No. 1.—S. Schönland, *Phanerogamic Flora of Uitenhage and Port Elizabeth*; pp. 118 (1919). A list of species occurring in these two divisions arranged after Engler's system, with an account of the area. A reprint in Dutch appeared in 1920.

Memoir No. 2.—R. D. Aitken and G. W. Gale, *Botanical Survey of Natal and Zululand*; pp. 19 (1921). A short paper with a somewhat misleading title, being really an account of a "Trip through North-Eastern Zululand", with a list of the plants collected.

Memoir No. 3.—S. Schönland, *South African CYPERACEAE*; pp. 72, pl. 1-80 (1922). Not a complete systematic account, as might be inferred from the title, but miscellaneous notes on the genera and selected species. Well illustrated with 80 plates.

Memoir No. 4.—*A Guide to Botanical Survey Work*; pp. 89 (1922). See notes above.

Memoir No. 5.—J. W. Bews and R. D. Aitken, *Researches on the Vegetation of Natal*; pp. 70 (1923). An account of some students' work at the Natal University College, including a paper on the genus *Cussonia* (ARALIACEAE).

Memoir No. 6.—E. M. Doidge, *Preliminary Check List of Plant Diseases Occurring in South Africa*; pp. 56 (1924).

Memoir No. 7.—E. E. Galpin, *Native Timber Trees of the Springbok Flats*; pp. 26, with 51 photographs (1924 ?).

Memoir No. 8.—J. W. Bews and R. D. Aitken, *Researches on the Vegetation of Natal, Series II* (1925). These give notes on the physiology of certain Natal plants.

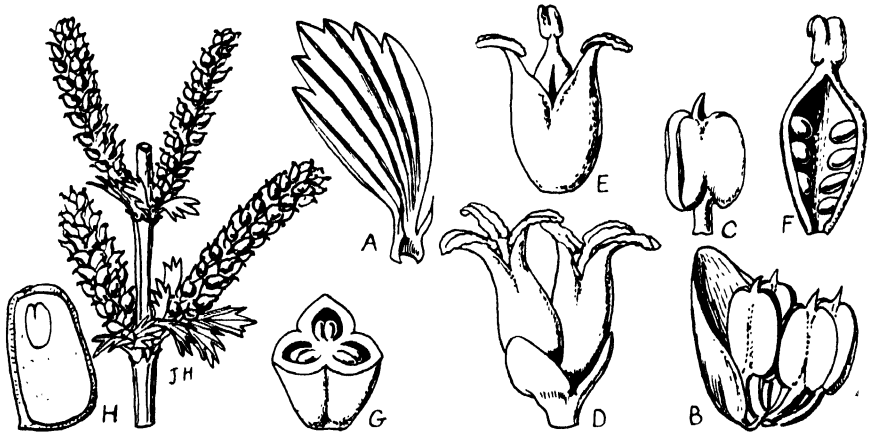
- Memoir No. 9.—E. P. Phillips, *Preliminary List of the Known Poisonous Plants found in South Africa*; pp. 30, with 20 plates (1926).
- Memoir No. 11.—E. M. Doidge and A. M. Bottomley, *Revised List of Plant Diseases Occurring in South Africa*; 78 pp. (1931).
- Memoir No. 12.—E. E. Galpin, *Botanical Survey of the Springbok Flats, Transvaal*; 100 pp. (1926).
- Memoir No. 13.—J. Muir, *Vegetation of the Riversdale Area, Cape Province*; pp. 82 (1929).
- Memoir No. 14.—J. F. V. Phillips, *Forest Succession and Ecology in the Knysna Region*; pp. 327, with 30 diagrams and 82 photographs (1931).
- Memoir No. 15.—Vegetation Map of South Africa (1928).
- Memoir No. 16.—J. Muir, *The Seed-Drift of South Africa, and some Influences of Ocean Currents on the Strand Vegetation*; pp. 108, ill. by plates and photographs (1937).
- Memoir No. 17.—R. A. Dyer, *The Vegetation of Albany and Bathurst*; pp. 138, 42 photographs (1937).
- Memoir No. 18.—R. S. Adamson, *Notes on the Vegetation of the Khamiesberg*; pp. 25, 6 photographs (1938).
- Memoir No. 19.—J. A. Pentz, *The Value of Botanical Survey and the Mapping of Vegetation as applied to Farming Systems in S. Africa*; pp. 15, 20 photographs and 2 maps (1938).
- Memoir No. 20.—H. G. Fourcade, *Check-List of the Flowering Plants of the Divisions of George, Knysna, Humansdorp and Uniondale*; pp. 127 (1941).

PART III

Chapter XV

PRETORIA TO THE ZOUTPANSBERG AND LIMPOPO RIVER WITH GENERAL SMUTS

EARLY morning on Friday, 14th December, saw General Smuts assisting me with my bag and botanical outfit from the hotel into the waiting cars. I was packed away with most of the personal luggage of the party in the General's car, a large Buick, which at that time seemed to be a very favourite make in South Africa. It ran beautifully throughout the tour. In the second car were Mr. Arthur Gillett (interested in birds) and his son Nicholas, with most of the food and cooking utensils; whilst the third car, a large Hudson, was driven by General Smuts' younger son, Jannie, accompanied by Mr. Jan Gillett, the one at that



Myrothamnus flabellifolia Welw. (MYROTHAMNACEAE), a "ressurrection plant" from the Magaliesberg.

A, leaf; B, male flower; C, anther; D, two female flowers; E, ovary; F, carpel, opened out; G, transverse section of ovary; H, vertical section of seed.

time a keen palaeontologist and archaeologist, the other a promising botanist with a strong bent for taxonomy. The last car bore also a native servant and the camp bedding and mosquito nets, for we were to visit country in which malaria might be contracted. Each evening, however, we took the precaution of parading for quinine, a measure which proved efficacious with all of us.

I soon had my first view of the Magaliesberg, which to me were disappointingly low, for from the map I had pictured them as being quite lofty mountains. We were, however, passing through the classical collecting ground of Burke and Zeyher, who gathered in this range a great number of type specimens of plants. To the right of us we saw the famous fig tree known as the "Wonderboom", *Ficus Pretoriae*



Triumfetta Sonderi Fic. & Hiern (TILIACEAE).

A, flower-bud; B, sepal; C, petal; D, stamens; E, anther; F, bristle from fruit.



Triumfetta Sonderi Fic. & Hiern (TILIACEAE), from north of Magaliesberg; the presence of this plant indicates very poor veld.



[*Photogr. : I. B. Pole Evans, Feb. 1929.*]

The Krauteyberg. Waterberg District; hill slopes covered with *Protea* and *Faurea* Bush.



[*Photogr. : I. B. Pole Evans, Feb. 1929.*]

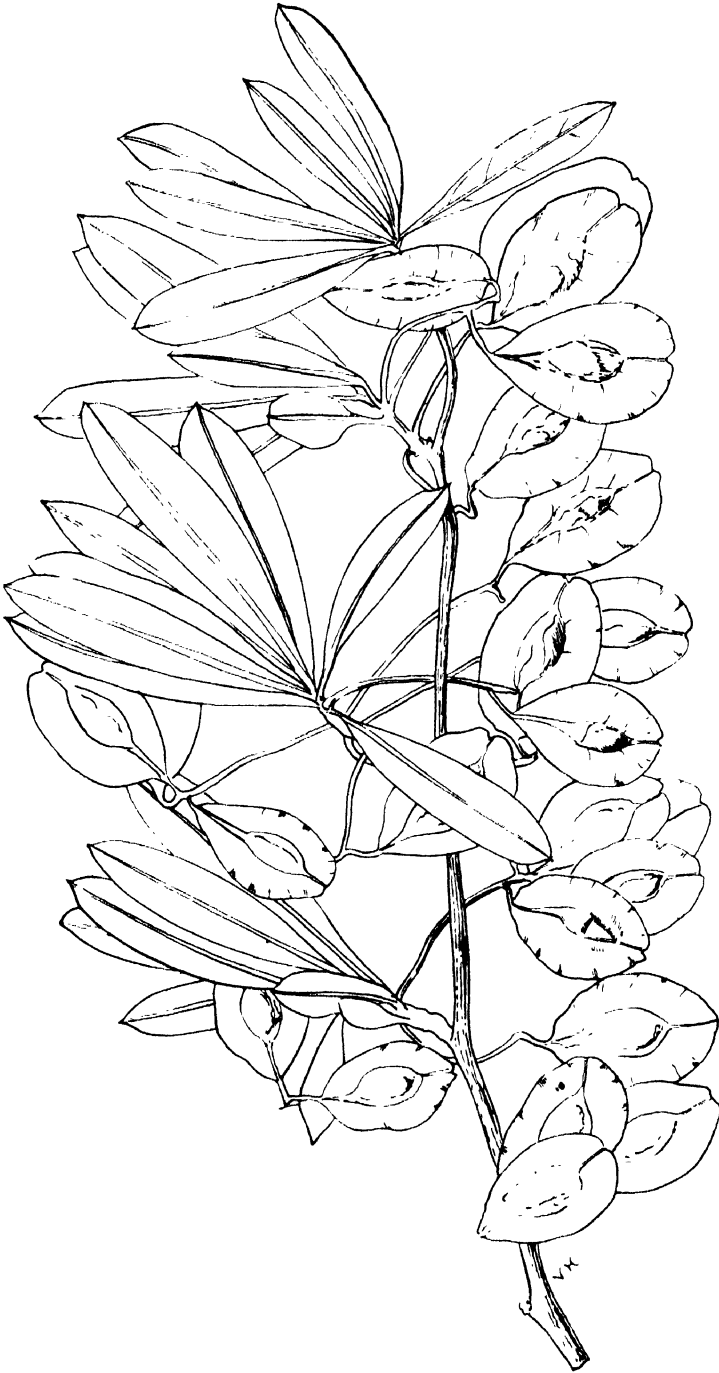
Pale blue water-lilies and wild rice in the Waterberg, Transvaal.

Burt Davy, from which the Wonderboom Poort and Station get their names. Just about here occurs another very interesting plant, *Myrothamnus flabellifolia* Welw., with flabellately nerved and folded leaves which close when dry and expand fan-wise when moist (p. 291). It is sometimes called a "resurrection plant". There was much *Acacia* and many beautiful willows in this district. Beyond the Poort we entered very flat country covered with rather dense *Acacia* bush. On our left was Pyramids Station, so named from the shape of the hills near by. Then a stretch of sandy soil with a curious vegetation of *Triumfetta Sonderi* Fic. & Hiern dotted at regular intervals among *Elionurus*, and signifying a poor type of veld. After that came wide stretches of *Acacia caffra* and *Combretum Zeyheri*.

On this very exhilarating morning, with a fine car beneath and a pleasant task in front of us, we felt in high spirits, and even the General waved gaily to some picnickers by the side of the road. For we were on the Cape-to-Cairo road, a road which one day will be, if not the finest, then one of the longest in the world. We passed on our left the home of Herr Haagener, ex-Director of the Hamburg Zoological Garden. Just about here I heard for the first time the South African schoolboy's definition of a river: "A dry place which sometimes contains water". I was destined much later in my tour to discover that although usually a dry place, a South African river may sometimes and quite suddenly contain a great deal of water.

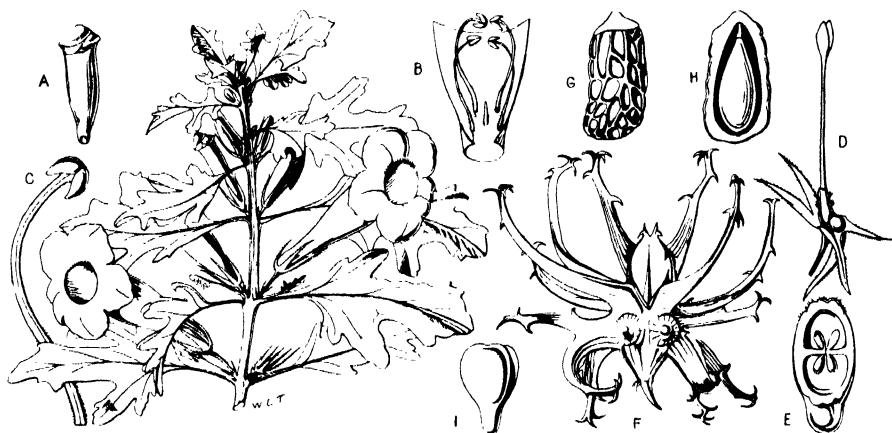
Soon we encountered quite a different type of vegetation—*Tarchonanthus* bush, and then *Terminalia sericea* (COMBRETACEAE) (No. 1900), one of the most beautiful trees of the Northern Transvaal, with lovely silvery foliage reminiscent of the Cape Silver-tree. Along the rivers were fine specimens of *Combretum salicifolium*, very like a willow, the latter, *Salix capensis*, occurring at Pienaar's River and Station. We paused to botanise for the first time in the Bushveld of the Waterberg near Warmbaths,¹ and collected a number of interesting plants which I had so far not seen in other parts of South Africa. Most notable were *Thunbergia atriplicifolia* Drège (ACANTHACEAE) (No. 1874), a herb with hispid stems, ovate-triangular entire leaves and white flowers on long pedicels; *Pavetta Zeyheri* Sond. (RUBIACEAE) (No. 1876), a shrub with linear-oblongolate leaves and lateral cymes of white flowers—a distinctly tropical element of this flora; *Vitex Poarea* Corbushley (VERBENACEAE) (No. 1877), with obovate, softly pubescent leaflets and dichotomous cymes of pale mauve flowers; *Rhynchosia monophylla* Schltr. (PAPILIONACEAE) (No. 1882), procumbent, with unifoliolate, ovate-cordate leaves, and scarlet axillary flowers; *Chry-*

¹ Also collected: No. 1875, *Lippia asperifolia* A. Rich. (VERBENACEAE); 1878, *Jatropha hirsuta* var. *oblongifolia* Prain (EUPHORBIACEAE); 1879, *Combretum Kraussii* Hochst. (COMBRETACEAE); 1880, *Vangueria* sp. (RUBIACEAE); 1881, *Pegolettia tenuifolia* Bolus (COMPOSITAE); 1885, *Diplorrhynchus mossambicensis* Benth. (APOCYNACEAE); 1886, *Coccinea Rehmannii* Cogn. (CUCURBITACEAE); 1888, *Adenia glauca* Schinz (PASSIFLORACEAE); 1889, *Zornia tetraphylla* var. *linearis* (PAPILIONACEAE); 1890, *Lotononis* sp. (PAPILIONACEAE); 1891, *Vangueria infausta* Burchell (RUBIACEAE); 1892, *Jatropha hirsuta* var. *oblongifolia* Prain (EUPHORBIACEAE); 1893, *Anthospermum* sp. (RUBIACEAE); 1894, *Fadogia monticola* Robyns (RUBIACEAE); 1895, *Ximenia caffra* Sond. (OLACACEAE); 1896, *Grewia monticola* Sond. (TILIACEAE); 1897, *Vitex Rehmannii* Gürke (VERBENACEAE); 1901, *Heeria salicina* B. Davy (ANACARDIACEAE); 1902, *Gladiolus* sp. (IRIDACEAE); 1903, *Aster* sp. (COMPOSITAE).



Terminalia sericea Burch. (COMBRETACEAE), one of the most beautiful trees of the Northern Transvaal, with silvery silky leaves. (Drawn by Violet Hutchinson.)

sophyllum magalismontanum Sond. (SAPOTACEAE) (No. 1883), small tree, leaves oblong, emarginate, rusty sericeous below (in fruit); *Strychnos pungens* Solereder (LOGANIACEAE) (No. 1884), a small tree with small, elliptic, very sharp-pointed leaves and small, globose fruit; *Pseudolachnostylis maprouneifolia* Pax (EUPHORBIACEAE) (No. 1887), tree, 15 ft. high, with rounded-elliptic, glaucous leaves and shiny fruit larger than a cherry, most of these reminding me very vividly of the great tropical flora to the north; *Gardenia spatulifolia* Stapf and Hutch. (RUBIACEAE) (No. 1898), with obovate-spathulate leaves and fibrous fruit; *Harpagophyton procumbens* Burchell (PEDALIACEAE) (No. 1899), procumbent, with pretty claret-coloured flowers, and grapple-fruits (see figure on this page). The evolution of this last is described on p. 329.



Harpagophyton procumbens Burchell (PEDALIACEAE).

A, corolla in bud; B, stamens and part of corolla; C, stamen; D, calyx and pistil; E, cross section of ovary; F, fruit; G, seed; H, vertical section of seed; I, embryo.

Warmbaths is the first place of any note after leaving Pretoria. It consists mainly of hotels and boarding-houses, which are patronised by patients seeking health from the hot springs in the neighbourhood. Beyond Warmbaths we traversed about 50 miles of perfectly level plain on a good straight road, along which we travelled at a great pace; for behind us in the Waterberg was gathering a terrific thunderstorm, which pursued us closely all the afternoon—a black pall to the south, accompanied by vivid lightning. It was probably playing havoc with those dry river-beds over which we had just passed, converting them no doubt into well-nigh impassable raging torrents.

In the Waterberg Hills,¹ however, we paused to gather a few interesting plants, including *Cissus oleracea* Bolus (AMPELIDACEAE) (No. 1904), erect and very fleshy, leaves suborbicular, dentate, flowers very small in terminal cymes; *Heteropyxis natalensis* Harv. (No. 1907),

¹ Also collected: No. 1906, *Pseudolachnostylis maprouneifolia* Pax (EUPHORBIACEAE); 1909, *Acalypha senensis* Klotzsch (EUPHORBIACEAE); 1910, *Sclerocarya caffra* Sond. (ANACARDIACEAE); 1911, *Viscum verrucosum* Harv. (LORANTHACEAE); 1912, *Loranthus oleifolius* var. *Leendertziae* Sprague; 1915, *Fluggea virosa* Baill. (EUPHORBIACEAE); 1916, *Rhus Engleri* J. Britten (ANACARDIACEAE); 1917, *Sida Dregei* B. Davy (MALVACEAE); 1918, *Boscia foetida* Schinz (CAPPARIDACEAE).

a monotypic family with pellucid-punctate leaves, formerly included in the LYTHRACEAE, but placed by me near the RHAMNACEAE, being regarded as a link between that family and MYRSINACEAE in the *Metachlamydeae*; *Cassia obovata* Collad (CAESALPINIACEAE) (No. 1913), the Senegal, Tripoli or Italian Senna, said to be more drastic in its action than Alexandrian Senna (*Cassia acutifolia* Del.); according to Phillips,¹ feeding tests have proved this plant to be poisonous to stock.

We stayed the night at Jones Hall, Potgietersrust, putting our plants into the presses after dinner. I wish I could have had a flash-light photograph of General Smuts sitting on the floor of my room and



[Photogr. : I. B. Pole Evans, Feb. 1929.]

The Krauteyberg mountains in the Waterberg, Northern Transvaal. Bush composed of *Lamnea discolor* Engl. (ANACARDIACEAE), *Combretum* spp. (COMBRETACEAE), *Rhamnus Zeyheri* Sond. (RHAMNACEAE), *Acacia robusta* Burch. and *A. litakunensis* Burch. (MIMOSACEAE).

laboriously assisting in pressing and labelling the spoils of the day. It would have been a unique picture, that of a former Prime Minister² of South Africa and a Kew botanist engaged in a common task!

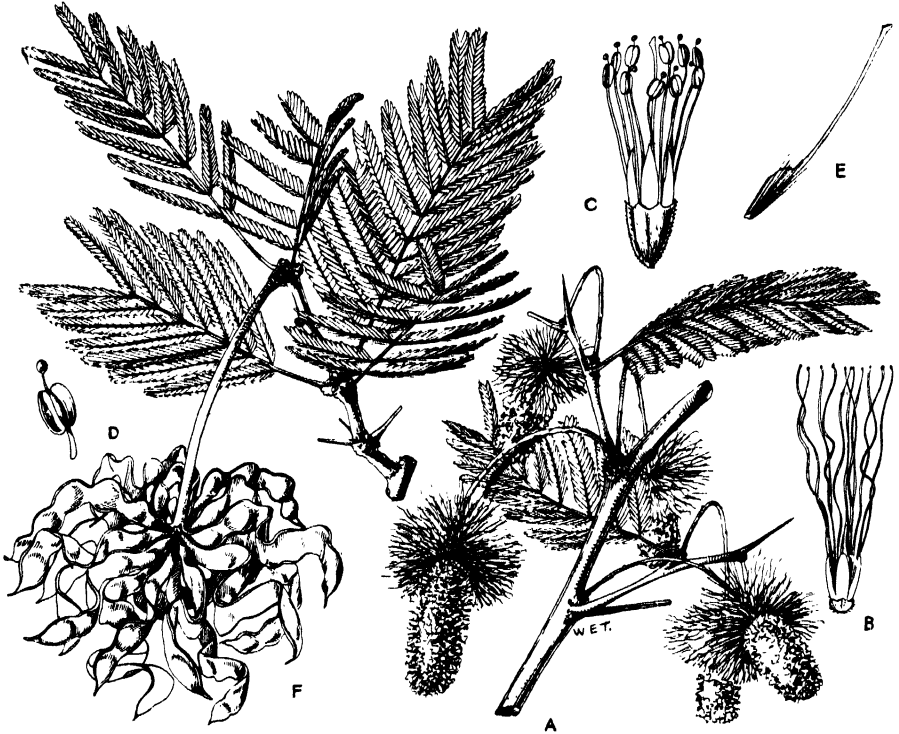
On Saturday, 15th December, our second day, we travelled from Potgietersrust as far as Louis Trichardt, at the foot of the Zoutpansberg. On this stretch we were often compelled to deviate from the main road, which for long distances was being made up. Just when we congratulated ourselves that at last we were on a fine stretch, quite suddenly would appear the barricade of tree-stems and thorn-bushes, compelling us to switch off on to the rough veld; for not even an ex-Prime Minister may travel over a newly made part of the road before it is declared open, no matter how finished it may be.

Just beyond Potgietersrust, about 2 miles from the town, we made a fairly large collection of species of mostly tropical genera, including

¹ *Bot. Survey S. Afr. Memoir*, 9 : 18.

² General Smuts was not in office at that time.

Boscia foetida Schinz (CAPPARIDACEAE) (No. 1918), a striking, dense tree with fascicles of very small oblanceolate leaves and small globose fruits. A Cucurbitaceous plant proved to be *Coccinea sessilifolia* (Sond.) Cogn. (No. 1922), with sessile deeply 5-lobed leaves; *Osyris compressa* (Berg.) A.DC. (SANTALACEAE) (No. 1932), noted by collectors as used for tanning leather, with angular branches, glaucous ovate-lanceolate acute leaves and small cymes of inconspicuous flowers; this



Dichrostachys glomerata (Forssk.) Chiov. (MIMOSACEAE), a widely spread species with yellow and purple catkin-like spikes.

A, flowering shoot; B, separate female flower; C, male flower; D, anther and apical gland; E, pistil; F, fruity branchlet.

plant has a wide range, right from the Cape Peninsula as far north as Abyssinia and Arabia. Here also I collected for the first time a small tree well known to me in the herbarium at Kew, namely *Dichrostachys glomerata* (Forssk.) Chiov. (MIMOSACEAE) (No. 1936), with yellow and purple, catkin-like spikes; later I discovered this to be a very hot fuel for the camp fire. *Clerodendrum lanceolatum* Gürke (VERBENACEAE) (No. 1948), a species with narrow tubular pale blue corolla common in the Zambesi basin. Another Legume seen for the first time, and a typical example of the Bushveld, was *Peltophorum africanum* Sond. (CAESALPINIACEAE) (No. 1957) a common tree with bright yellow flowers (see figure, p. 300). Our fairly large collection at this spot, 2 miles north of Potgietersrust, is worth setting out in systematic order as follows :—

Collected 2 miles north of Potgietersrust, Transvaal,
15th December, 1928

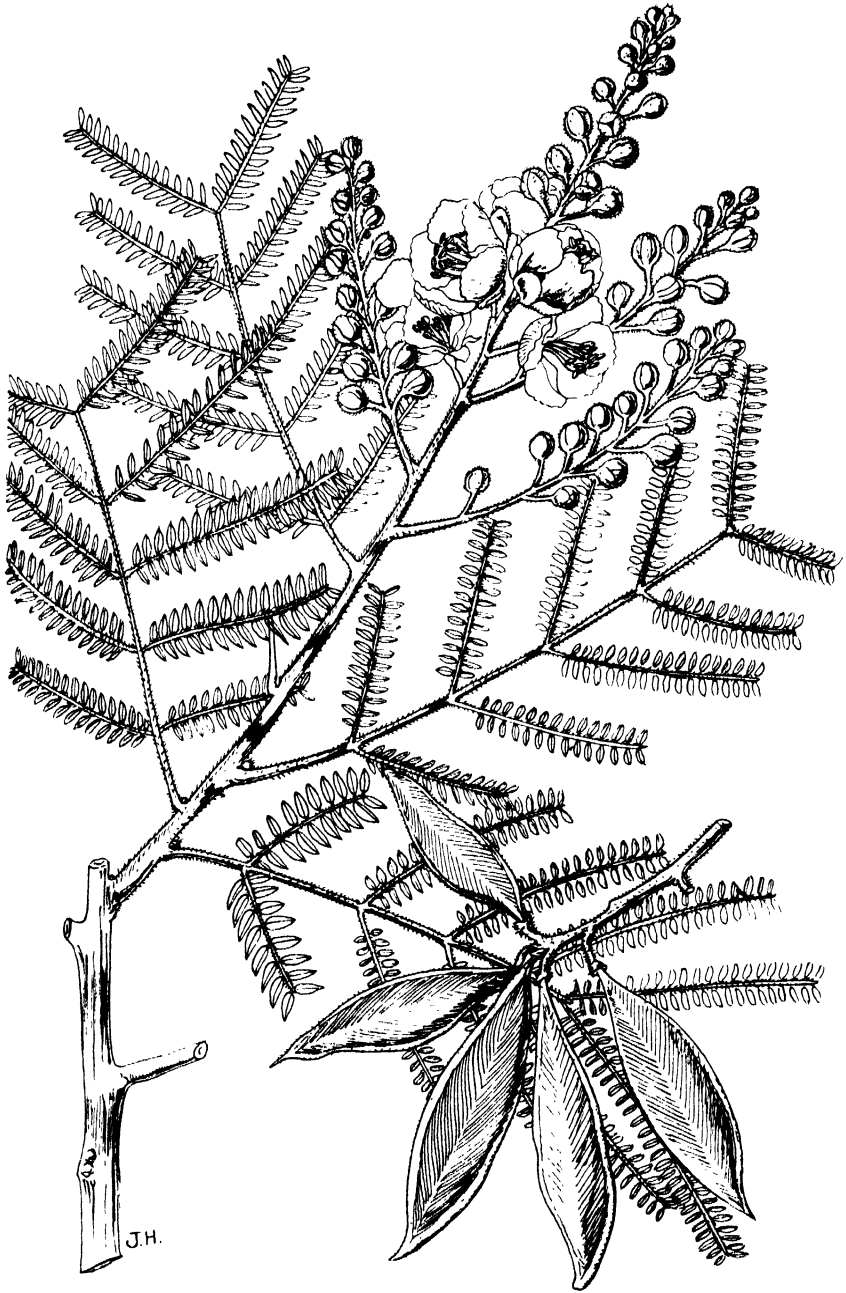
LIGNOSAE (WOODY DICOTYLEDONS)

- EBENACEAE—**Royena pallens** *Thumb.* (No. 1938): shrub; leaves oblanceolate, thinly pubescent; fruits the size of a small cherry, minutely pubescent.
Euclea ovata *Burch.* (No. 1933): shrub; leaves narrowly ovate, brown-scurfy below; flowers green, 3 in a cymule; ovary villous.
- CAPPARIDACEAE—**Boscia foetida** *Schinz* (No. 1918) (see notes, p. 298).
- CUCURBITACEAE—**Coccoloba sessilifolia** (*Sond.*) *Cogn.* (No. 1922) (see note, p. 298).
- THYMELAEACEAE—**Lasiosiphon Kraussianus** *Meisn.* (No. 1943).
- TILIACEAE—**Corchorus trilocularis** *Linn.* (Nos. 1928, 1942): leaves crenate-serrate, the lowermost teeth with thread-like points; flowers yellow.
Grewia flava *DC.* (No. 1965): small tree, with softly tomentose leaves, and bright yellow flowers.
- MALVACEAE—**Pavonia Burchellii** (*DC.*) *R. A. Dyer* (No. 1930): stems weakly pilose; leaves cordate at the base, 3-lobed, lobes coarsely and obtusely dentate; stipules linear-filiform; flowers yellow, on slender pedicels.
Sida Dregei *B. Davy* (Nos. 1917, 1959): flowers yellow on very long pedicels.
- EUPHORBIACEAE—**Phyllanthus maderaspatensis** *Linn.* (Nos. 1924, 1955): branches numerous from a woody taproot; leaves narrowly elliptic to lanceolate; flowers solitary in each leaf-axil, the female soon developing into fruit.
Fluggea virosa *Baill.* (No. 1935): branches ending in spines; male flowers with rudimentary ovary. **Jatropha Zeyheri** *Sond.* (No. 1962): stems 1 ft. from a woody rhizome, softly pilose; leaves deeply trilobed, lobes oblong, denticulate; flowers greenish yellow in small terminal cymes. **Tragia rupestris** *Sond.* (No. 1923): creeper with stinging hairs; leaves ovate-cordate, acuminate, dentate; calyx deeply cut, setose.
- CAESALPINIACEAE—**Peltophorum africanum** *Sond.* (No. 1957) (see note, p. 298).
- MIMOSACEAE—**Dichrostachys glomerata** (*Forssk.*) *Chior.* (No. 1936) (see note, p. 298). **Acacia litakunensis** *Burch.* (No. 1934): tree 20 ft.; leaflets very small, linear; spines paired, recurved; flowers in small yellow balls.



[Photogr. : I. B. Pole Evans, Sept. 1933.]

Dombeya densiflora Pl. (STERCULIACEAE); flowers like a Hawthorn, between Pietersburg and Louis Trichardt, Northern Transvaal.



Peltophorum africanum Sond. (CAESALPINIACEAE), a common tree in the Bushveld of the Transvaal.

PAPILIONACEAE—**Indigofera macra** *E. Mey.* (Nos. 1926, 1940): stems very slender, 1 ft. high; leaflets lanceolate, mucronate; flowers purple, in short long-pedunculate racemes. **Dolichos axillaris** *E. Mey.* (No. 1958): stems prostrate; leaflets lobulate on one side; flowers purple, solitary, axillary. **Rhynchosia minima** *DC.* (No. 1920): stems twining; leaflets ovate-rhomboid, gland-dotted below; flowers very small, greenish-yellow. **Otoptera Burchellii** *DC.* (No. 1951) (see figure below).

SANTALACEAE—**Osyris compressa** (*Berg.*) *A. DC.* (No. 1932) (see note, p. 298).

RHAMNACEAE—**Zizyphus mucronata** *Willd.* (No. 1931): small tree; branches thorny; leaves trinerved, ovate, crenulate, glabrous; flowers greenish.

ANACARDIACEAE—**Rhus pyroides** *Burch.* var. **gracilis** (*Engl.*) (No. 1964): shrub 12 ft.; leaflets softly tomentose; flowers paniculate, green.



Otoptera Burchellii *DC.* (PAPILIONACEAE).

A, side view of flower; B, fruit; C, standard; D, wing; E, keel; F, stamens; G, gynoecium; H, upper part of style and stigma.

EHRETIACEAE—**Ehretia rigida** (*Thunb.*) *Druce* (Nos. 1919, 1939): shrub; leaves clustered on arrested branchlets, spatulate-oblancoate, emarginate; cymules of deep-mauve flowers pedunculate; fruit small, green.

VERBENACEAE—**Lantana salvifolia** *Jacq.* (No. 1927): shrub; leaves scabrid-bullulate; flowers deep pink, in pedunculate heads. **Clerodendrum lanceolatum** *Gürke* (syn. **C. simile** *H. H. W. Pears.*) (No. 1948) (see above).

HERBACEAE (HERBACEOUS DICOTYLEDONS)

NYCTAGINACEAE—**Boerhaavia pentandra** *Burch.* (No. 1925): leaves ovate-triangular; flowers crimson.

COMPOSITAE—**Melanthera Brownei** *Sch. Bip.* (No. 1929): straggler; leaves opposite, ovate-lanceolate, crenate, scabrid; rays yellow. **Aster luteus** (*N. E. Br.*) *Hutch.* (No. 1967): root woody; leaves broadly linear, very hispid; rays white. **Psalidia arabica** *Jaub. & Spach* (No. 1945): shrub;

leaves lanceolate, viscid, minutely toothed; flower-heads golden-yellow. **Vernonia fastigiata** Oliv. & Hiern (No. 1937): leaves linear, 1-nerved; bracts with slender points, cobwebby-ciliate; flowers purple.

CONVOLVULACEAE—**Evolvulus alsinoides** Linn. (No. 1963): leaves densely pilose, flowers blue or white. **Ipomoea obscura** Ker (Nos. 1921, 1947): creeper, leaves ovate-triangular, deeply cordate at the base; flowers axillary, solitary, yellow.

SCROPHULARIACEAE—**Aptosimum lineare** Engl. & Marl. (No. 1954): dwarf; leaves clustered, numerous, linear, ciliolate; flowers among the leaves, purplish-pink. **Cyrenium adonense** E. Mey. (No. 1950): stems prostrate; leaves ovate-elliptic, coarsely serrate, drying black; calyx nearly half as long as the pure white corolla.

ACANTHACEAE—**Thunbergia atriplicifolia** Drège (No. 1949). **Ruellia ovata** Thunb. (No. 1966): leaves ovate-elliptic, setulose-ciliate; flowers subsessile, pale blue.

LABIATAE—**Orthosiphon Wilmsii** Gurke (No. 1951): leaves ovate, crenate, hairy only on the nerves; flowers mauve.

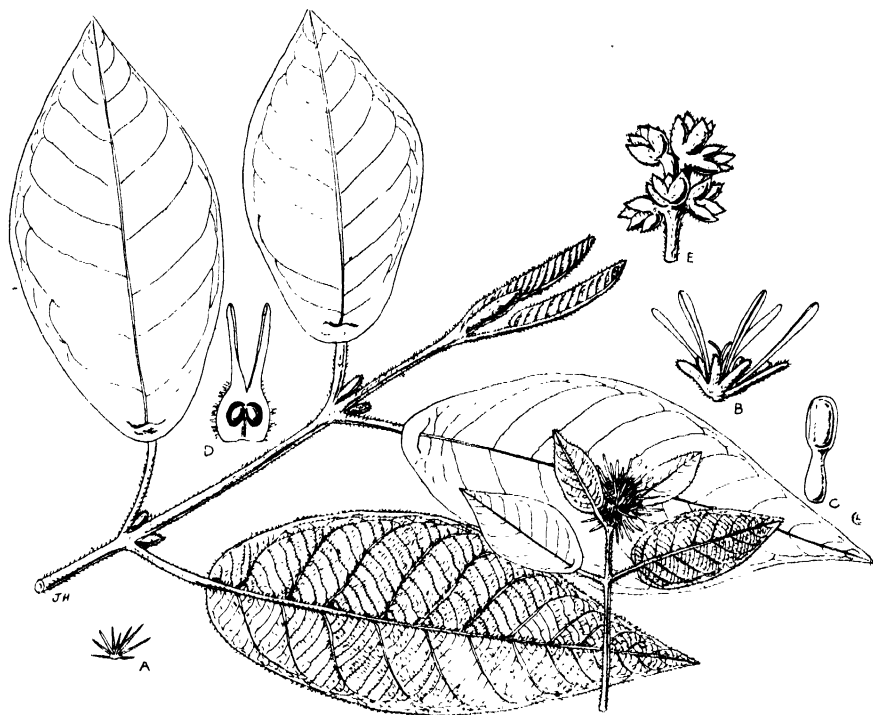
MONOCOTYLEDONS

LILIACEAE—**Ornithogalum glaucum** Salisb. (No. 1953): leaves 3–5, suberect, lanceolate; flowers lemon-yellow, on long pedicels; perianth-segments linear. **Bulbine asphodeloides** R. & S. (No. 1941): 1 ft. high, with numerous linear basal leaves and dense racemes of lemon-yellow flowers. **Athericum polyphyllum** Baker (No. 1946): 1 ft. high; leaves narrow, slightly sickle-shaped; perianth-segments white, with green midrib; bracts acuminate, toothed.

On rising ground between Potgietersrust and Pietersburg we stopped to make a further collection,¹ the most striking of which were a pretty little *Gerbera*, *G. glandulosa* Dummer (COMPOSITAE) (No. 1970), with oblanceolate pilose denticulate leaves, the rays orange-yellow above and red below; *Mundulea sericea* (Willd.) A. Chev. (syn. *M. suberosa* Benth.) (PAPILIONACEAE) (No. 1978), a shrub 6 ft. high, with bluish-purple flowers—a fish-poison said to kill and not merely stupefy fish; the bark and roots have been suggested for making an insecticide; *Lannea edulis* Engl. (ANACARDIACEAE) (No. 1980), suffruticose, leaflets elliptic, entire, softly pubescent below; *Vangueria tomentosa* Hochst. (RUBIACEAE) (No. 1981) a shrub 8 ft. high, with small tomentose suborbicular leaves and axillary clusters of small green flowers.

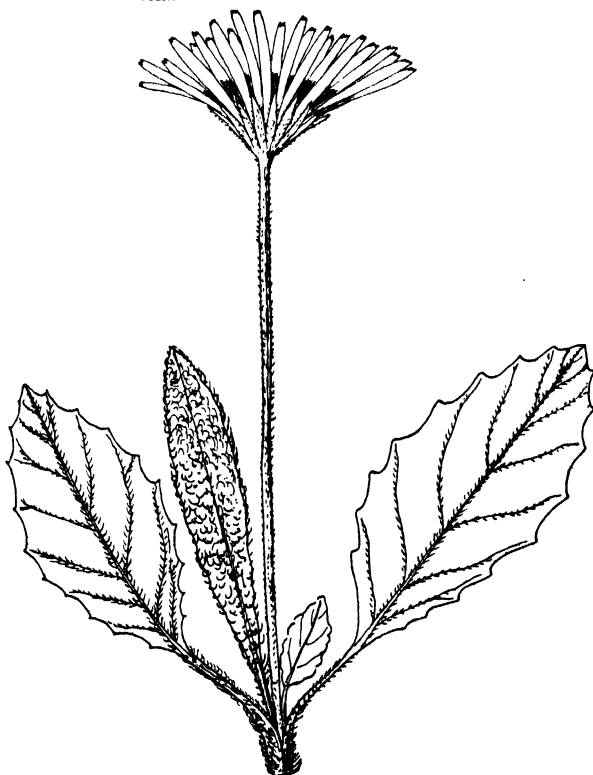
We lunched at Pietersburg—quite a contrast to Potgietersrust, and a busy commercial town with new buildings everywhere. From Pietersburg it is rather a long trek to Louis Trichardt, with some weird and wonderful scenery *en route*, the Blaauwberg and other mountains rising up ghostly and unreal in the shimmering heat to the westward, the nearby kopjes at Matrox having a character all their own, with a tiny native village nestling at the base of each. Verily this was the Africa of my imagination! Here we passed some giant *Euphorbias*, *E. ingens* E. Mey. (see photograph, p. 304) which tower over the

¹ Also collected: No. 1968, *Ruellia ovata* Thunb. (ACANTHACEAE); 1972, *Melhania prostrata* P. DC. (STERCULIACEAE); 1973, *Ormocarpum setosum* B. Davy (PAPILIONACEAE); 1974, *Vigna* sp. (PAPILIONACEAE); 1975, *Cyanotis nodiflora* Kunth (COMMELINACEAE); 1976, *Helichrysum subulifolium* Harv. (COMPOSITAE); 1977, *Rhoicissus erythroides* (Fres.) Planch. (AMPELIDACEAE); 1979, *Grewia occidentalis* Linn. (TILIACEAE); 1982, *Viscum suberratum* Schltr. (LORANTHACEAE); 1983, *Cissus oleracea* Bolus (AMPELIDACEAE); 1984, *Acacia robusta* Burch. (MIMOSACEAE); 1985, *Heeria reticulata* Engl. (ANACARDIACEAE); 1986, *Eriosema cordatum* E. Mey. (PAPILIONACEAE).



Trichocladus crinitus
Pers. (HAMAMELIDACEAE), found in the
forests from George
to Natal.

A, stellate hair from
leaf; B, flower; C, sta-
men; D, vertical section
of ovary; E, fruit.



Gerbera glandulosa Düm-
mer (COMPOSITAE),
from north of Pieters-
burg.

remainder of the somewhat scanty vegetation. The last twenty miles are perfectly straight, and would gladden the eyes of a racing motorist. There are probably few roads in the world dead straight for such a long distance. And I saw no side-roads !

Sunday, 16th December, was Dingaans Day, and whilst General Smuts went to a rendezvous some miles away to make a speech to the burghers, the remainder of our party took the car from Louis Trichardt



Euphorbia ingens E. Mey. (EUPHORBIACEAE), at Matoks, Northern Transvaal.

to the top of the pass leading into Wylie's Poort. We had a somewhat hot and tiring climb through big rocks to the top of the Zoutpansberg, from which we enjoyed the splendid panorama, and collected a number of interesting plants,¹ including *Dioscorea cotinifolia* Kunth (DIOS-

¹ Also collected : No. 1989, *Euclea lanceolata* E. Mey (EBENACEAE); 1990, *Vernonia lasioclada* Hutch. (COMPOSITAE); 1992, *Rhus transvaalensis* Engl. (ANACARDIACEAE); 1993, *Eulophia ensata* Lindl. (ORCHIDACEAE); 1995, *Faurea saligna* Harv. (PROTEACEAE), on lower kopjes; 2000, *Ficus craterostoma* Warb. (MORACEAE); 2001, *Eulophia Krebsii* (Reichb. f.) Bolus (ORCHIDACEAE); 2003, *Psychotria capensis* Vatke (RUBIACEAE); 2007, *Combretum Kraussii* Hochst. (COMBRETACEAE); 2010, *Aeschynomene leptobotrys* Harms (PAPILIONACEAE); 2011,

COREACEAE) (No. 1987), a twiner with small simple ovate-cordate leaves and oblong winged fruits; *Syzygium cordatum* Hochst. (MYRTACEAE) (No. 1988), a tree with oblong-elliptic cordate leaves and purplish red fruits; *Pterocarpus rotundifolius* (Sond.) Druce (syn. *P. sericeus* Benth.) (PAPILIONACEAE) (No. 1991), a tree 20 ft. high on the lower kopjes, with suborbicular emarginate shiny discolorous leaves silky below, and panicles of cream flowers; a beautiful large *Scilla*, *S. natalensis* Planch.



Mimosa Zeyheri Sond. (SAPOTACEAE), from the Zoutpansberg.

A, flower; B, corolla opened out with stamens; C, stamen with two staminal nodes; D, pistil; E, cross-section of ovary; F, fruit.

(LILIACEAE) (No. 1994), with large softly pubescent leaves and sky-blue flowers on a rhachis 1½ ft. high; a pretty *Solanum*, *S. panduræforme* E. Mey. (SOLANACEAE) (No. 1996), with thinly tomentose lanceolate

Oleandra africana R. Bon. (FILICES); 2013, *Lippia asperifolia* A. Rich. (VERBENACEAE); 2014, *Indigofera subcorymbosa* var. *Eylesii* Bak. f. (PAPILIONACEAE); 2015, *Muraltia azorella* Chod. (POLYGALACEAE); 2016, *Polygala Rehmanniana* Chod. (POLYGALACEAE); 2019, *Combretum Kraussii* Hochst. (COMBRETACEAE); 2021, *Corchorus pongolensis* B. Davy and Greenway (TILIACEAE); 2022, *Gerbera glandulosa* Dummer (COMPOSITAE); 2023, *Euclea lanceolata* E. Mey. (EBENACEAE); 2024, *Harveya coccinea* Schlechter? (SCROPHULARIACEAE); 2025, *Ochna atropurpurea* A. DC. (OCHNACEAE); 2028, *Polygala Rehmannii* Chod. (POLYGALACEAE); 2029, *Senecio latifolius* DC. (COMPOSITAE); 2031, *Senecio coronatus* Harv. (COMPOSITAE); 2032, *Cryptolepis oblongifolia* Schltr. (ASCLEPIADACEAE); 2033, *Raphionacme alata* N.E. Br. (ASCLEPIADACEAE); 2034, *Eulophia ensata* Lindl. (ORCHIDACEAE); 2035, *Eupatorium africanum* L. (COMPOSITAE); 2036, *Asclepias cucullata* Schltr. (ASCLEPIADACEAE).

leaves and few prickles, mauve flowers, and yellow fruits; *Cynium adonense* E. Mey. (SCROPHULARIACEAE) (No. 1997), with prostrate bracts, leaves drying black, and long-tubed white flowers, the calyx about one-third the length of the tube; *Sphedamnocarpus galphimifolius* Szysz. (No. 1998), a malpighiaceae climber with oblong elliptic leaves clothed with medifixed hairs, and small yellow flowers; a pretty *Crossandra*, *C. Greenstockii* S. Moore (ACANTHACEAE) (No. 1999), a herb 1 ft. high, with broadly oblanceolate leaves and short spikes of salmon flowers. No. 2002 proved to be an interesting new variety of *Dioscorea*, *D. Dregeana* var. *Hutchinsonii* Burkill (DIOSCOREACEAE), a climber in fruit and growing under dense shade among big boulders. *Mimusops Zeyheri* Sond. (No. 2004), grew on the lower kopjes, one of the few SAPOTACEAE in South Africa, and of very limited distribution, being confined to the Northern Transvaal and the Swaziland border of Portuguese East Africa (see figure, p. 305). A pretty *Loranthus* (No. 2005), with long silky greenish-grey flowers proved to be *L. Dregei* Eck. & Zeyh. Growing on the face of a rock was a widely distributed species of *Ficus*, *F. ingens* Miq. (MORACEAE) (No. 2006), with cordate oblong-ovate leaves and small shortly stalked figs, and a *Protea* (No. 2008) proved to be the widely distributed *P. abyssinica* Willd. (PROTEACEAE), with obtuse oblanceolate leaves and rather small heads surrounded by silky bracts. A distinctive *Vernonia* (No. 2012), has since been collected and described as new by Bremekamp, *V. triflora* (COMPOSITAE), a shrub with small rhomboid-obovate dentate leaves and small subsessile corymbs. A showy *Scrophulariaceae* plant proved to be *Buchnera brevibractealis* Hiern (No. 2017), with linear leaves and short spikes of bright blue flowers. No. 2018 proved to be *Otiophora cupheoides* N.E.Br., which is the same as *Anthospermum calycophyllum* Sond. of the *Flora Capensis*, and therefore requires a new combination, *Otiophora calycophylla* (Sond.) Hutch., *comb. nov.* This plant is not easy to recognise, several genera being similar, such as *Oldenlandia*, *Pentanisia*, etc. The species is confined to the Northern Transvaal.

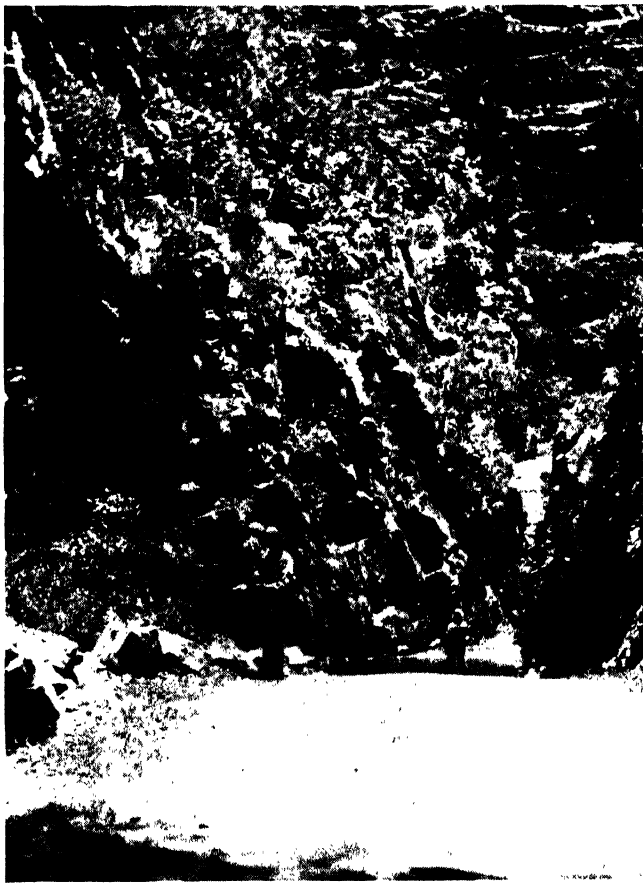
A conspicuous Rubiaceae shrub, 12 ft. high or so, with spatulate-obovate leaves shortly pubescent below, with lateral subsessile cymes of white flowers, was *Pavetta Schumanniana* Hoffm. & K. Schum. (No. 2020). Another shrub of great interest to me personally was our No. 2026, which has proved to be a fruiting example of Legat No. 23, determined by me (see p. 271) in 1909 as *Tricalysia* sp. near *T. jasminiflora* Hook. f., and gathered in flower by Legat in September 1908, between Louis Trichardt and the Geluk Farm. So far as I know, no other collector has gathered this shrub, which proves to be undescribed. I have much pleasure in calling it *Tricalysia Legatii*, and give a description below.¹

¹ ***Tricalysia Legatii* Hutch. sp. nov.**

Frutex usque ad 3 m. altus; ramuli laterales breves, cicatricibus foliorum delapsorum verrucosi. Folia elliptico-obovata, apice leviter et late acuminata vel rotundata, basi leviter angustata, 2-3 cm. longa, 1.5-2 cm. lata, in nervis breviter setulosa; stipulae e basi lato breviter subulatae; flores precoci, cremei, in axillis foliorum delapsorum solitarii et subsessiles; bractae late ovatae, villosae; calycis lobi late ovati, acute acuminati, 7 mm. longi; corollae tubus 1 cm. longus, appresse villosus; lobi oblongo-elliptici, 1 cm. longi, villosi; antherae parte exsertae, 6 mm. longae; stylus pubescens; fructus globosus, 1 cm. diametro, appresse pubescens.

Zoutpansberg: between Louis Trichardt and Geluk Farm, on sides of hills

Descending the pass on foot, we collected on a stony kopje by the side of the road fine flowering material of *Pterocarpus rotundifolius* (Sond.) Druce (see figure, p. 320), a representative of the tropical flora which finds its way thus far south and no farther. Indeed, the Zoutpansberg, and no doubt the Blaauwberg (see p. 394), prove an effective barrier to the southerly migration of many tropical species, and next day we saw



[Photogr. by the Author.]

Gorge at the northern end of Wylie's Poort, with General Smuts collecting by the side of the road.

a large number of these interesting species at the northern entrance to Wylie's Poort.

On Monday, 17th December, we started early through Wylie's Poort, and explored the chasm by the stream near the northern entrance. The vegetation by the side of the stream near the northern entrance to the poort is quite tropical in character, and as our collection

bounding the valley, Sept., 1908, *Legat* 23 (type in Kew Herbarium); near Louis Trichardt, Dec., 1928 *Hutchinson* 2026.

was fairly considerable, the species need systematic arrangement as follows :—

**Collected near the Northern Entrance to Wylie's Poort,
Zoutpansberg, December, 1928**

LIGNOSAE (WOODY DICOTYLEDONS)

HERNANDIACEAE—*Gyrocarpus asiaticus* Willd. (No. 2049): large tree, leaves digitately nerved, broadly obovate-cuneate, lobulate, softly and shortly pubescent below; fruits with two terminal oblong-lanceolate wings (see below).

SAPOTACEAE—*Chrysophyllum magalismontanum* Sond. (No. 2076): small tree; leaves oblong-oblancheolate, glabrous above, rusty-silky below.

CAESALPINIACEAE—*Cassia abbreviata* Oliv. (No. 2038): small tree, fruits very long and narrow. ***C. occidentalis* Linn.** (No. 2056): shrub; with yellow flowers.



Gyrocarpus asiaticus Willd. (HERNANDIACEAE),
from Wylie's Poort, Zoutpansberg.

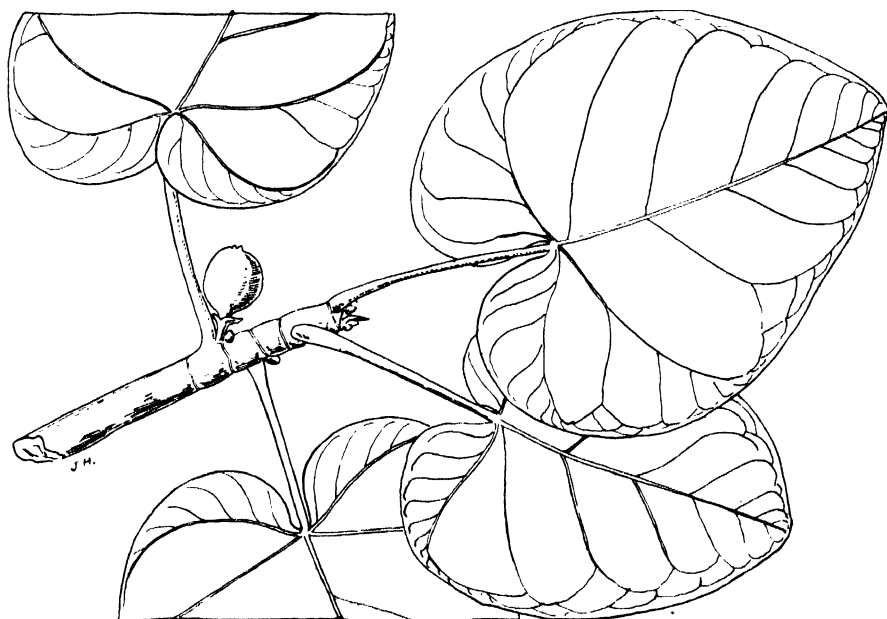
MIMOSACEAE—*Acacia erladdenia* Benth. (No. 2062): bush; branches prickly; leaflets very numerous; flowers yellow, in slender spikes. ***A. pennata* Willd.** (No. 2095): climber; branches prickly; flowers white, in small heads arranged in panicles.

PAPILIONACEAE—*Eriosema Burkei* Benth. (No. 2096): leaflets oblong-lanceolate, softly tomentose below; fruits densely villous.

SALICACEAE—*Salix Wilmsii* Seem. (No. 2088): tree, near stream; leaves very glaucous below.

MORACEAE—*Ficus soldanella* Warb. (No. 2041): leaves ovate-orbicular, cordate, 5-nerved at the base; figs sessile, globose.

- URTICACEAE—**Pouzolzia hypoleuca** Wedd. (No. 2094): herb; leaves broadly ovate, 3-nerved at the base, white below.
- NYCTAGINACEAE—**Boerhaavia pentandra** Burch. (No. 2092): leaves ovate, widely cordate; fruits glabrous.
- CAPPARIDACEAE—**Maerua triphylla** (Thunb.) Dur. & Schinz (No. 2068): shrub; leaflets broadly oblanceolate; fruits ovoid-ellipsoid, 3 cm. long; seeds verrucose. **Cleome oxyphylla** Burch. (No. 2046): herb with 7-8-foliolate leaves and few pink flowers.
- TILIACEAE—**Grewia occidentalis** L. (Nos. 2043, 2063, 2084): leaves broadly oblong-elliptic, thinly stellate-pubescent on both surfaces; stipules linear; flowers small in bracteate cymes.
- STERCULIACEAE—**Dombeya elegans** K. Schum. (No. 2059): small tree near stream; leaves pentagonal, cordate, finely stellate-puberulous below; flowers few on a slender peduncle, white.
- MALVACEAE—**Hibiscus lunariifolius** Willd. (No. 2087): softly woody; leaves pentagonal, cordate at the base; flowers large, yellow with a crimson blotch.
- EUPHORBIACEAE—**Bridella micrantha** Baill. (No. 2057): small tree; leaves obovate-elliptic, with the lateral nerves continued to and forming the margin. **Fluggea virosa** Baill. (No. 2093): shrub, with obovate thin leaves and numerous small axillary flowers, the males with a rudimentary ovary.



Ficus soldanella Warb. (MORACEAE), from Wylie's Poort, Zoutpansberg, Transvaal.

- Phyllanthus heterophyllus** Müll. Arg. (Nos. 2067, 2082): small shrub; male flowers with 3 stamens, the anthers horizontal. **Croton gratissimus** Burch. (No. 2052): small tree; leaves oblong-lanceolate, white below and densely covered with scales. **Acalypha glabrata** Thunb. (Nos. 2074, 2089): shrub; leaves ovate-rhomboid, crenate, pubescent on the nerves below. **Androstachys Johnsonii** Prain (observed). **Dalechampia capensis** Spreng. f. (No. 2050): twiner; leaves digitately 3-5-foliolate; female bracts greenish-white, digitately lobed, denticulate.
- OCHNACEAE—**Ochna atropurpurea** (No. 2025): small tree, calyx red, berries black; pedicels articulated at the base. **O. Rogersii** Hutch. (No. 2079).



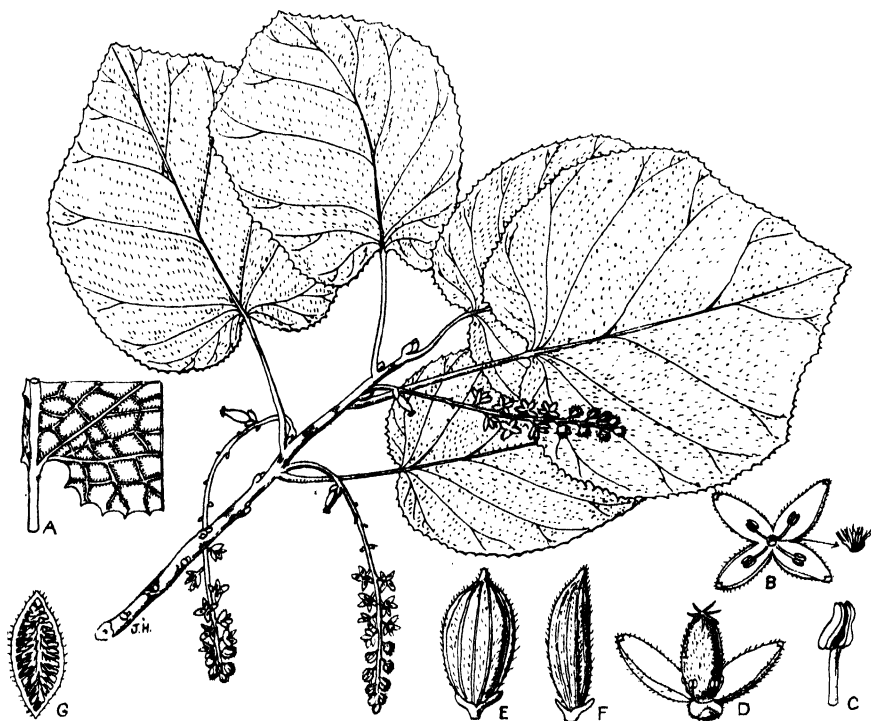
Northern Entrance to Wylie's Poort.

- COMBRETACEAE—*Combretum imberbe* Wawra (No. 2058): tree 25 ft.; leaves oblong-ob lanceolate, emarginate and mucronate, densely lepidote below; flowers greenish-yellow. *C. glomerulliflorum* Sond. (No. 2065): tree; leaves narrowly obovate, acutely acuminate, pubescent on the nerves below.
- HIPPOCRATEACEAE—*Hippocratea longipetiolata* Oliv. (No. 2077) (syn. *H. Schlechteri* Loes.), climbing shrub; leaves broadly lanceolate, cuneate at the base, crenate; flowers small in oblong panicles.
- ICACINACEAE—*Pyrenacantha grandiflora* Baill. (Nos. 2078, 2091) (see figure, p. 311).
- RHAMNACEAE—*Helinus ovatus* E. Mey. (Nos. 2073, 2090): climber with axillary tendrils; leaves ovate-elliptic, mucronate, very thin; flowers small in pedunculate axillary cymes.
- AMPELIDACEAE—*Rhoicissus capensis* (Burm. f.) Planch. (No. 2069): leaves pentagonal, undulate-crenate, 3-nerved at the base, glabrous below. *Cissus quadrangularis* L. (No. 2037): stems broad and flattened, winged; almost leafless.
- RUTACEAE—*Calodendron capense* Thunb. (No. 2086).
- BURSERACEAE—*Commiphora Marlothii* Engl. (No. 2040): branchlets stout; leaflets oblong, crenate, shortly acuminate, softly pubescent; fruits small, fleshy.



Bridelia micrantha Baill. (EUPHORBIACEAE), widely distributed in tropical Africa.

A, male shoot; B, female shoot; C, flower-bud; D, male flower; E, anther; F, female flower; G, longitudinal section of female flower; H, cross-section of ovary; I, fruit.



Pyrenacantha grandiflora Baill. (ICACINACEAE), a low shrub from Wylie's Poort.

A, portion of lower surface of leaf; B, male flower and by its side the rudimentary ovary enlarged; C, stamen; D, female flower; E, fruit; F, fruit, side view; G, cross-section of fruit.

- ANACARDIACEAE—*Lannea Kirkii* *Burtl. Davy* (No. 2053): small tree; leaflets ovate-rhomboid, entire, hairy below in the axils of the lower nerves; flowers small, paniculate; fruits obliquely ellipsoid, glabrous.
- OLEACEAE—*Olea verrucosa* *Link* (No. 2064): small tree; leaves lanceolate, densely and finely lepidote below, flowers very small, in small panicles.
- APOCYNACEAE—*Carissa edulis* *Vahl* var. *tomentosa* *Stapp* (No. 2075): branches with pairs of sharp spines; leaves ovate, pubescent on the nerves below; flowers red.
- ASCLEPIADACEAE—*Secamone frutescens* (*E. Mey.*) *Decne* (No. 2070): twiner; leaves broadly linear, glabrous; flowers very small, green, axillary. *Gymnema sylvestre* *R. Br.* (Nos. 2072, 2097): twiner; leaves ovate-elliptic, rounded at the base, pubescent on the nerves below; flowers greenish, subumbellate on short peduncles. *Pergularia Daemia* (*Forssk.*) *Chiov.* (*Pergularia extensa* *R. Br.*) (No. 2042): leaves widely ovate-cordate, acutely acuminate, thinly and softly pubescent below; cymules on long peduncles.
- EHRETACEAE—*Ehretia rigida* (*Thunb.*) *Druce* (No. 2081). *Cordia Rogersii* *Hutch.* (No. 2066) (see p. 315).
- RUBIACEAE—*Pavetta Eylesii* *S. Moore* (No. 2051): large shrub; leaves broadly elliptic, with numerous lateral nerves, drying dark green; flowers numerous, cymose, white; calyx subtruncate.

HERBACEAE (HERBACEOUS DICOTYLEDONS)

- CRASSULACEAE—*Crassula expansa* *Ait.* (No. 2071): weak and prostrate by stream; leaves small, oblanceolate; flowers solitary, axillary, very small.
- COMPOSITAE—*Helichrysum quinquenerve* (*Thunb.*) *Less.* (No. 2060): stem leaves sessile, decurrent, ovate, 5-nerved, thinly lanate below; cymes long-pedunculate, heads light golden-yellow. *Nidorella senecionidea* *DC.* (No. 2061): leaves sessile, shortly pubescent below; heads small, yellow. *Senecio garcianus* *Schltr.* (No. 2047): fleshy shrub; leaves small, elliptic, mucronate; heads discoid, cymose, with narrow involucre.
- SOLANACEAE—*Solanum panduraeforme* *E. Mey.* (No. 2055): small shrub, stellate-tomentose all over; leaves lanceolate, entire; flowers deep mauve.
- PEDALIACEAE—*Pterodiscus ngamicus* *N.E. Br.* (No. 2039).
- ACANTHACEAE—*Ruellia patula* *Jacq.* (No. 2054): a herb with ovate leaves and solitary axillary pale-mauve flowers. *Asystasia gangetica* *T. Ands.* (No. 2083): slender herb in forest undergrowth, with small spikes of small white flowers.

MONOCOTYLEDONS

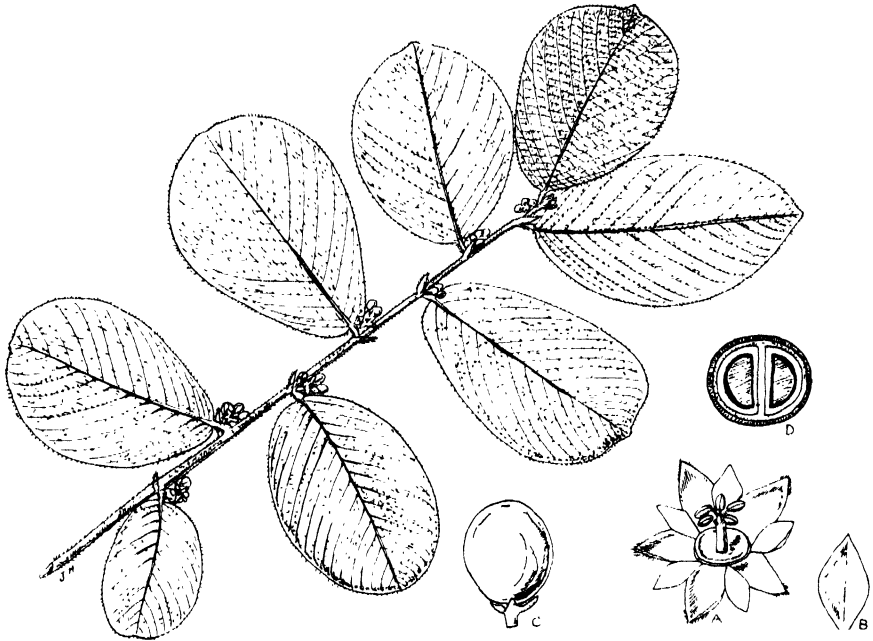
- GRAMINEAE—*Cenchrus ciliaris* *L.* (No. 2044): spikes continuous, up to 15 cm. long, very bristly.

It may be noted that Wylie's Poort shelters a curiously mixed type of vegetation, most of the species being definitely of tropical origin from the north, and others typical of the Cape Region from the south. Of tropical origin or affinity are *Gyrocarpus americanus* *Jacq.*, a pan-tropical species, and we were the first to collect this in the Union of S. Africa; it has since been found by Pole Evans in the Northern Transvaal (no loc.) and by Dinter in the S.W. African Protectorate; *Combretum imberbe* *Wawra*, common in the Zambesi Basin and ranging as far as Tanganyika Territory; *Bridelia micrantha* *Baill.* (EUPHORBIACEAE), widely distributed in tropical Africa; *Ficus soldanella* *Warb.* occurs as far south as the Magaliesberg and northwards in the Lower Zambesi; *Commiphora Marlothii* *Engl.* ranges from Bechuanaland to the Waterberg, whilst *Pavetta Eylesii* *S. Moore* has been found elsewhere only in the Matopos.

A very interesting find, and at that time only the second time collected in the Transvaal, was *Pyrenacantha grandiflora* *Baill.* (ICACINACEAE) (Nos. 2078, 2091), a low shrub with ovate-orbicular cordate largish leaves 5-nerved from the base, denticulate, and scabrid on both

surfaces, with short setulose hairs on the veins, slender racemes of green male flowers, with solitary or paired female flowers near the base. It was first collected in the Transvaal, at Shilouvane, by Junod (No. 735) before 1904, and has since been collected by Bremekamp and Schweickerdt in the Ngelele Valley, near Lake Fundusi, and by Obermeyer at Tshakoma.

There are three species of *Pyrenacantha*, mostly a tropical genus, known from South Africa : *P. scandens* Planch. ex Harv. (*Thes. Cap.* 1, 14, t. 28), which occurs in woods from George around the south-east



Bridelia mollis Hutch. (EUPHORBIACEAE).

A, male flower; B, petal; C, fruit; D, cross section of fruit.

districts to Durban; *P. kamassana* Baill., from Punda Maria, in the Kruger National Park (also in South Tropical Africa), and *P. grandiflora* Baill., Natal and the Northern Transvaal. I must confess that I was puzzled for some time as to the identity of this shrub, just as Alexander Prior was over that of *P. scandens*, for I find the following note on one of his sheets of this species at Kew : " Put by Endlicher into the order *Antidesmeae* (Euphorbiaceae) and comes very near *Pyrenacantha*; cannot be far from *Menispermaceae*." In order to assist the novice in determining this plant I give a detailed black-and-white figure (see p. 311). Besides tropical Africa, the genus also occurs in India.

On Tuesday, 18th, we were up at five o'clock, and botanised on the northern face of the Zoutpansberg on the western side of the poort. Here the Asclepiad, *Sarcostemma viminale*, was quite a tree, with whip-like almost leafless green branches. Among many interesting plants were my own species of *Bridelia*, *B. mollis* Hutch., and I was agreeably surprised and delighted to find also here quite small forests of the rare and interesting *Androstachys Johnsonii*, which was first

described by Sir David Prain from specimens gathered in Portuguese East Africa. Towards the top of the range was a fine stand of grass, *Cenchrus ciliaris* L.

After striking camp we proceeded northwards through the last gap in the mountains, and soon traversed flat country very rich in *Combretum* and *Copaifera Mopane*, the latter dominant over wide areas and resembling pear-trees in habit. In another part of this book I have called this flat region from the Zoutpansberg to the Limpopo the *Mopane Veld*, and it stretches far into Rhodesia and Angola.

By the side of the road we passed a huge Baobab, *Adansonia digitata* L., with a trunk 50 ft. round and only about 50-60 ft. high, and we soon saw many more specimens of this wonderful tree. The photograph below shows one nearly three times as big.

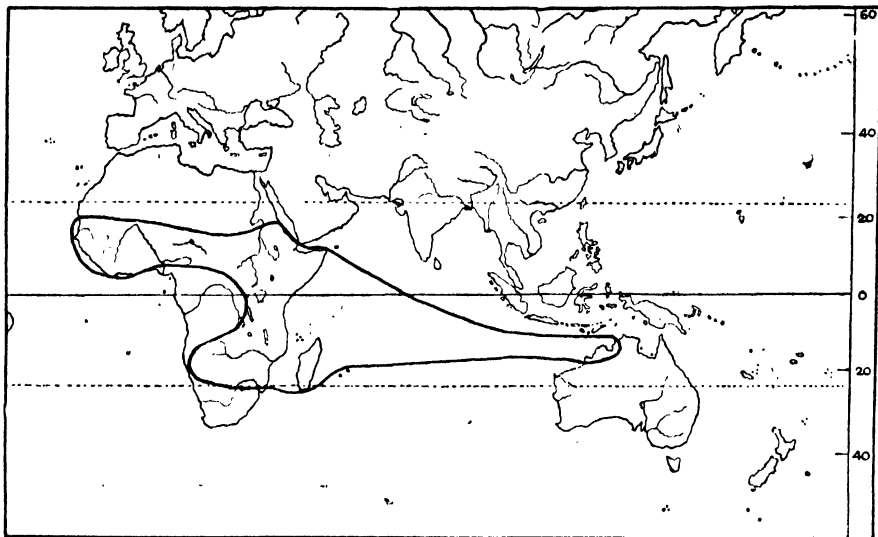
The distribution of the genus *Adansonia* is of considerable interest (see map). It is found in tropical Africa and the Northern Transvaal, Madagascar and Northern Australia. The number of species is still somewhat doubtful, but some may be mentioned as certainly distinct.

The type species is *A. digitata* L. (syn. *A. sphaerocarpa* A. Chev.), which grows in dry savannah from Senegal in the north-west to Abyssinia in the east and south as far as the Zoutpansberg. Adanson, after whom the genus is named, was the first botanist to study the flora of Senegal and the Gambia, where he travelled from 1749 to 1754. *A. digitata* is cultivated in Madagascar, the Comoro Islands, India and the West Indies. Trees usually occur scattered, but on the northern slopes of the Zoutpansberg and in the adjacent flats they are very numerous, and grow fairly close together. Nowhere else have I seen them in such quantity.



[Photogr. : I. B. Pole Evans, Aug. 1929.]

A large Baobab, *Adansonia digitata* Linn. (BOMBACACEAE), 148 ft. in circumference, in the Botanical Reserve, Dongola, Northern Transvaal.



Range of *Adansonia*, the Baobab genus, showing an interesting connection between Africa and Australia.

There are two quite distinct species in Northern Australia: *A. Gregori* Mueller, which differs conspicuously from *A. digitata* in the leaflets being softly and densely tomentose on the lower surface, and the petals narrowly spathulate-oblongate; the other species is *A. Stanburyana* Hochr., with glabrescent leaves and the calyx glabrous outside.

In Madagascar there seem to be several species besides the cultivated *A. digitata*. I have seen specimens of *A. Grandidieri* Baill., with softly tomentellous leaves (as in the Australian *A. Gregori*), but with a very short staminal tube. A second very distinct species is *A. Za* Baill., with long-stalked glabrous leaflets and long strap-shaped glabrous petals. According to Jumelle and La Bathie,¹ there are several other species in Madagascar: *A. madagascariensis* Baill., *A. rubrostipa* Jumelle and La Bathie, *A. alba* Jumelle and La Bathie, *A. Bozy* Jumelle and La Bathie, and probably another unnamed species. We also collected here a small *Cordia* tree (No. 2066) which appears to be undescribed, and which I have pleasure in naming after the Rev. F. A. Rogers,² who collected it

¹ See H. Jumelle and H. Perrier de la Bathie in *Annales du Musée Col. Marseille*, 2e Sér., 8: 430 (1910).

² *Cordia Rogersii* Hutch. sp. nov., affinis *C. caffrae* Sond., sed foliis minus dentatis, floribus minoribus differt.

Arbor parva; rami cortice brunneo obtecti, glabri, juniores parce pubescentes. Folia ovato-elliptica, breviter acuminata, basi rotundata vel late cuneata, 3-4.5 cm. longa, 1.5-2.5 cm. lata, papyracea, obscure crenata vel subintegra, primum parce pubescentia, mox glabra; nervi laterales utrinsecus circiter 3, valde inconspicui; petioli graciles, 1.5-2.5 cm. longi, glabri. Cymae terminales, pauciflorae, tenuiter pubescentes; alabastra tantum visa, globosa, 2 mm. diametro, parce pubescentia. Fructus ovoideus, 1.3 cm. longus, glaber, calyce persistente patelliforme lobulato et crenato circumdatus.

Northern Transvaal: Louis Trichardt, Oct. 1918, *F. A. Rogers* 21698 (type in Kew Herbarium). Wylie's Poort, near stream at northern entrance, small tree, young flowers green, Dec. 1928, *Hutchinson* 2066.

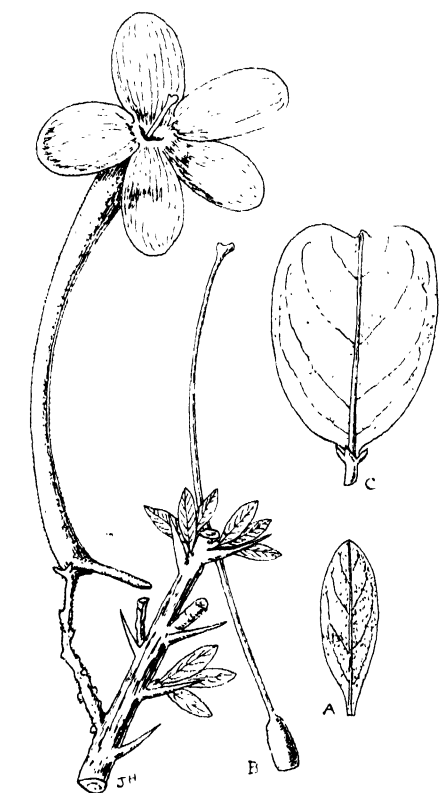
in 1918. It differs from *C. caffra* Sond. in having less toothed leaves and much smaller flowers, *C. caffra* apparently being confined to coast districts from Inanda, Natal, to Bathurst, and favouring sand-dunes.

We were now on a good, sandy road, the grass being very much dried up and no flowers visible to collect; so we speeded on to Messina, where we arrived at 12.30. We continued on a little farther, and I had my first glimpse of the Limpopo River, which for some distance forms the boundary between the Union and Southern Rhodesia. At Main Drift

the broad sandy river is about a third of a mile across from bank to bank, but at the time of our visit the stream was not very wide. Later in the day we enjoyed the luxury of a bathe, and swam across to the other side.

We lunched under a huge and wide-spreading *Ficus gnaphalocarpa*, and most of the party enjoyed a midday siesta. This *Ficus* tree must have shaded quite half an acre of ground. Later we botanised by the side of the Limpopo among numerous fine trees of this *Ficus* and of *Ficus capensis* Thunb., which grew on both banks. We also collected another fig which has since been described by Miss Verdoorn as *F. Smutsii* (No. 2100) (see figure, p. 321). Here we collected *Pseudocadia zambesiaca* (Baker) Harms (No. 2099), a tree I was particularly anxious to find, with glossy dark foliage and a very unleguminous fruit.

I noted fine specimens of an *Adenia* with a huge green tuber, and only a few yards away an *Adenium*, the one PASSIFLORACEAE, the other APOCYNACEAE. It was curious that such different plants with names so similar should be growing side by side.



Sesamothamnus Lugardii N.E. Br.
(PEDALIACEAE), from the Limpopo River.

A, leaf; B, pistil; C, fruit.

Perhaps the most striking plant to me was *Sesamothamnus Lugardii* N.E.Br. (No. 2098) belonging to the PEDALIACEAE, a spiny shrub with long white flowers like a *Gardenia*, but the corolla-tube with a long narrow spur at the base (see figure above). This plant is also found in the North Kalahari, and although named after Lugard, it was first collected by Chapman and Baines about 1864. The genus ranges as far north as Somaliland. Here also we found a species of *Hexalobus*, *H. glabrescens* Hutch. & J. M. Dalz. (ANNONACEAE) (No. 2103), which I had not long previously described for the *Flora of West Tropical Africa*. Later I received a note about this from Mr. Ralston, Estates Manager, Bellevue

Cotton Estates, P.O. Villa Nova, via Potgietersrust, in which he says that the shrub attains 5-6 ft. and grows on rocky ground on cliffs; the fruit is 2 in. long, deep red when ripe and of an excellent flavour; it makes good jelly with a tart flavour. I was fortunate also to meet with two species of RUBIACEAE recently elevated to generic rank by a former pupil of mine, Dr. W. Robyns, now Director of the Botanic Garden at Brussels—namely *Lagynias lasiantha* (Sond.) Bullock (No. 2127) and *L. dryadum* (S. Moore) Robyns (No. 2129) (see figure, p. 318).

Another plant collected here also needs special discussion. This was our No. 2145, *Sterculia Rogersii* N.E. Br. (STERCULIACEAE), about which I am compelled to cross swords with Dr. Bremekamp, who has, I consider, quite unnecessarily reduced this species to *S. triphaca* R.Br., now to be called *S. africana* (Lour.) Merrill.

In *S. africana* the leaves are rather coarse and almost constantly 3-lobed, the lobes being tailed-acuminate; the indumentum, if any, is thin and *scabrid-stellate*, the branchlets are thickish, and the inflorescence branched.

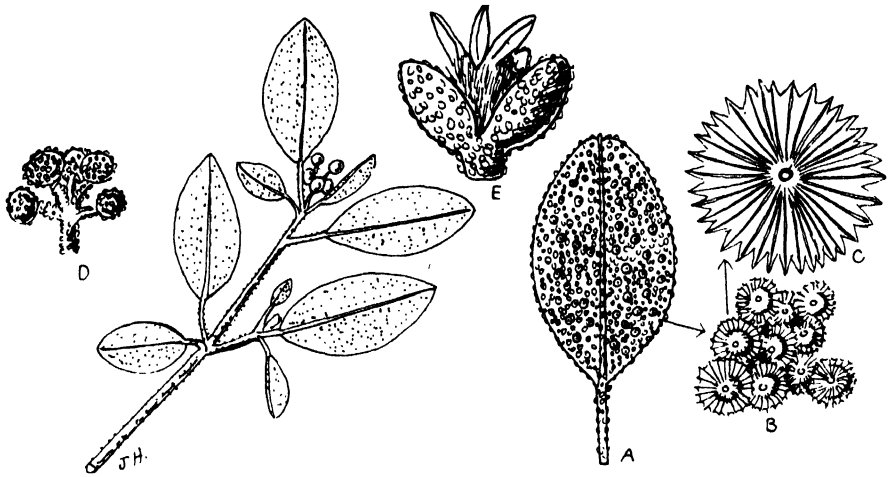
In *S. Rogersii*, on the other hand, the leaves are smaller and quite delicate, constantly *softly tomentellous* all over, not lobed, or only very slightly so, and not tailed; the branchlets are twiggy, and the inflorescence very small.

Most taxonomic botanists would, I think, certainly regard them as two distinct species, and they are just as different as many other longer-established pairs of species of *Sterculia*.

List of Plants Collected near Main Drift, Messina, Limpopo River, 18th December, 1928

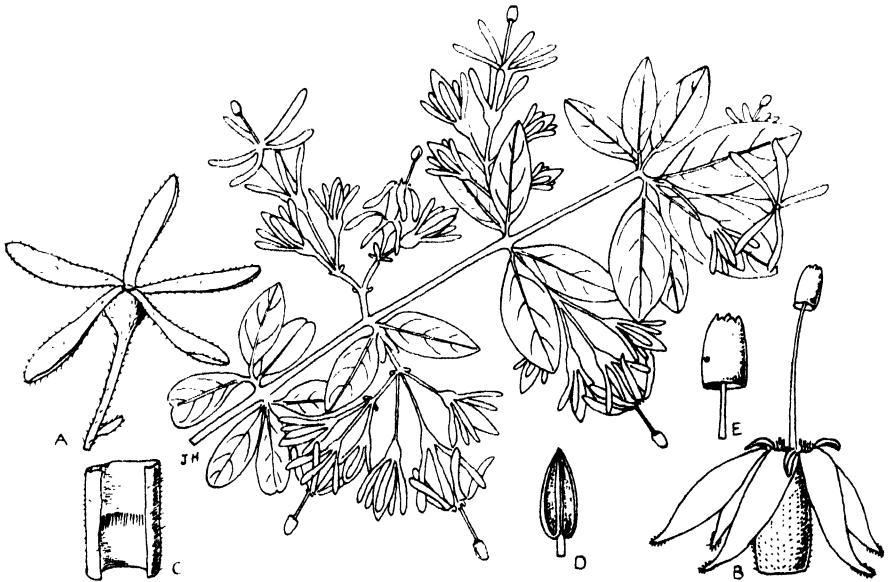
LIGNOSAE (WOODY DICOTYLEDONS)

- ANNONACEAE—*Hexalobus glabrescens* Hutch. & J. M. Dalz. (No. 2103): large shrub; branchlets flexuous; leaves oblong; young fruits rusty-tomentose.
- CAESALPINIACEAE—*Pseudocadia zambesiaca* (Baker) Harms (No. 2099): large tree on banks of river).
- MORACEAE—*Ficus Smutsii* Verdoorn (No. 2100) (see figure, p. 321).
- TILIACEAE—*Grewia hexamita* Burret (Nos. 2113, 2121): shrub; leaves oblong-elliptic, very unequal-sided at the base, glabrous above, softly tomentose below; flowers subsolitary, large. *Corechorus pongolensis* B. Davy & Greenway (Nos. 2105, 2124): leaves oblong-lanceolate, obtusely serrate, softly tomentellous on both surfaces; flowers yellow.
- EUPHORBIACEAE—*Bridelia mollis* Hutch. (No. 2125): shrub, softly tomentellous all over; leaves elliptic-obovate (see figure, p. 313). *Androstachys Johnsonii* Prain (Nos. 2104, 2118): small tree; leaves and branches opposite, former broadly ovate-cordate, softly white-tomentose below; fruits deeply 3-5-lobed. *Croton pseudopulchellus* Pax (No. 2106): small tree; leaves small, narrowly ovate, minutely pubescent on the upper surface, densely covered with silvery scales below.
- OCHNACEAE—*Ochna Rogersii* Hutch. (No. 2112).
- SIMARUBACEAE—*Kirkia acuminata* Oliv. (Nos. 2109, 2115) (see p. 328).
- BURSERACEAE—*Commiphora pyracanthoides* Engl. (No. 2107): shrub with spine-tipped branches; leaves obovate, attenuated to the base, sharply serrate.
- ANACARDIACEAE—*Lannea Kirkii* B. Davy (Nos. 2111, 2116): tree; leaves pinnate, leaflets ovate-rhomboid, acuminate; fruits compressed, coarsely reticulate.
- LOGANIACEAE—*Strychnos innocua* Del. (Nos. 2108, 2126): shrub with arrested side-branchlets bearing clusters of elliptic 3-nerved leaves pubescent on the nerves below.



Croton pseudopulchellus Pax (EUPHORBIACEAE), from Messina, Limpopo River, Northern Transvaal.

A, leaf showing scales; B, scales enlarged; C, one scale, enlarged; D, flower buds; E, female flower.



Lagynias dryadum (S. Moore) Robyns (RUBIACEAE).

A, calyx; B, corolla and style; C, part of corolla opened to show ring of hairs; D, anther; E, stigma.

- ASCLEPIADACEAE—**Secamone zambesiaca** *Schlechter* (syn. *S. zambesiaca* var. *parvifolia* N.E. Br.) (No. 2122): small tree; leaves opposite, broadly ovate; flowers yellow, few, in shortly pedunculate cymules (ours the typical form, but the variety is scarcely tenable).
- RUBIACEAE—**Canthium Mundtianum** *Cham. & Schl.* (Nos. 2110, 2128): shrub; leaves ovate- or oblong-elliptic; flowers very small, in small axillary cymes; pedicels puberulous. **Lagynias lasiantha** (*Sond.*) *Bullock* (No. 2127): shrub; leaves glaucous green below, glabrous; calyx-lobes spatulate, nearly as long as the corolla-bud. **L. dryadum** (*S. Moore*) *Robyns* (No. 2129) (see p. 317, and figure, p. 318). **Tarenna barbertonensis** *Bremek.* (No. 2130): shrub with narrowly oblanceolate shining leaves and small cymes of greenish-cream flowers.
- VERBENACEAE—**Vitex Harveyana** *H. H. W. Pears.* (Nos. 2101, 2123): small tree; leaves trifoliate, leaflets subsessile, narrowly obovate, entire or crenate in the upper half; flowers mauve.
- BIGNONIACEAE—**Markhamia acuminata** *K. Schum.* (No. 2117): small tree; leaflets 5-7, the terminal much the largest; flowers mauve; calyx split down one side.

HERBACEAE (HERBACEOUS DICOTYLEDONS)

- MENISPERMACEAE—**Desmonema tenerum** (*Miers*) *Diels* (No. 2102): climber; leaves ovate rounded, very slightly peltate at the base; flowers in slender panicles.
- PORTULACACEAE—**Talinum caffrum** *Eckl. & Zeyh.* (No. 2119): prostrate stems, fleshy; flowers pink.
- UMBELLIFERAE—**Steganotaenia araliacea** *Hochst.* (**Peucedanum fraxinifolium** var. **Galpinii** *B. Dary*) (No. 2114): a tree; leaves pinnate, leaflets on slender stalks, long-acuminate, ovate, toothed, the teeth ending in a slender bristle.
- PEDALIACEAE—**Pterodiscus speciosus** *Hook.* (No. 2120): stems short from a tuber; leaves pinnately lobulate, glaucous-papillous below; flowers pink; fruits suborbicular, winged. **Sesamothamnus Lugardii** *N.E. Br.* (No. 2098) (see figure, p. 316).

I remember Messina best because our whole party were accommodated and lavishly entertained by Mr. Emery, the Manager of the Messina Copper Mine, and because it was here that I tasted the largest and sweetest grape-fruit I have ever seen, and a change indeed from our simple camp fare.

In spite of comfortable beds, however, we were up at five o'clock next morning, and started for the Government Reserve farm at Dongola. We lost our way on leaving the village, and went quite 30 miles on the wrong road before realising our mistake. We inquired at two farms, at one of which I noted a family of seven children, at the other five, and at last arrived at our destination, where we were joined by Dr. I. B. Pole Evans and an assistant in the Government caravan.

We selected a nice camping-place in the native compound, and after a belated breakfast set off in the caravan to explore the Reserve, and I am sure we must have looked uncommonly like the characters of a Jules Verne story of fifty years or so before. I give a picture of some members of our party on the top of a kopje.

The Dongola Reserve consists mostly of Mopane scrub, with much *Commiphora* and other spiny shrubs, and very numerous Baobabs, some with exceptionally large stems.

After a tiring day in the intense heat, I was glad to pitch my camp bed under a *Ficus* tree near the edge of the native compound, as there was not room for me with the rest of the party under a canvas canopy which had been erected. I soon regretted being on my own, however,



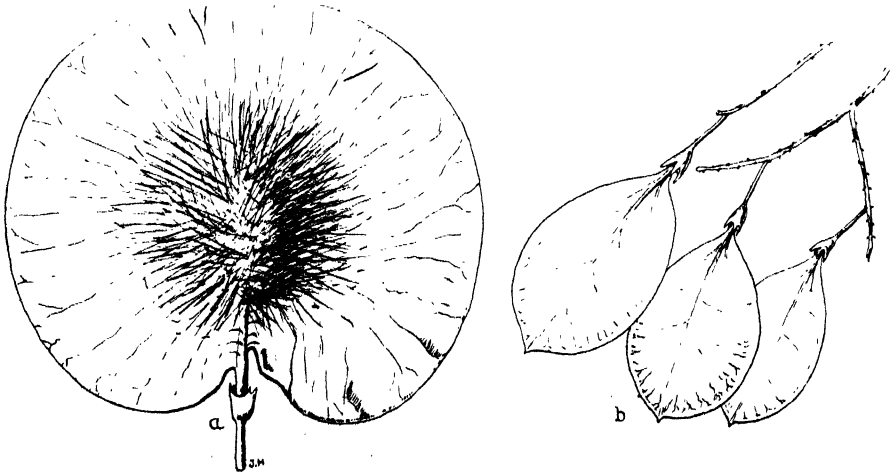
[Photogr. by the Author.]

A busy trio of botanists in the Zoutpansberg. General Smuts, Jan Gillett and Mrs. Gillett.

for it was not long before I was awakened from a deep sleep by a voice from the safe interior of the caravan in the middle of the compound.

"Hutch, can you hear the lions? Those are lions roaring."

Had I heard them? Yes, indeed I had. The same question was hurled across the compound several times during the night, no doubt much to the annoyance of my fellow-travellers, who were a little more

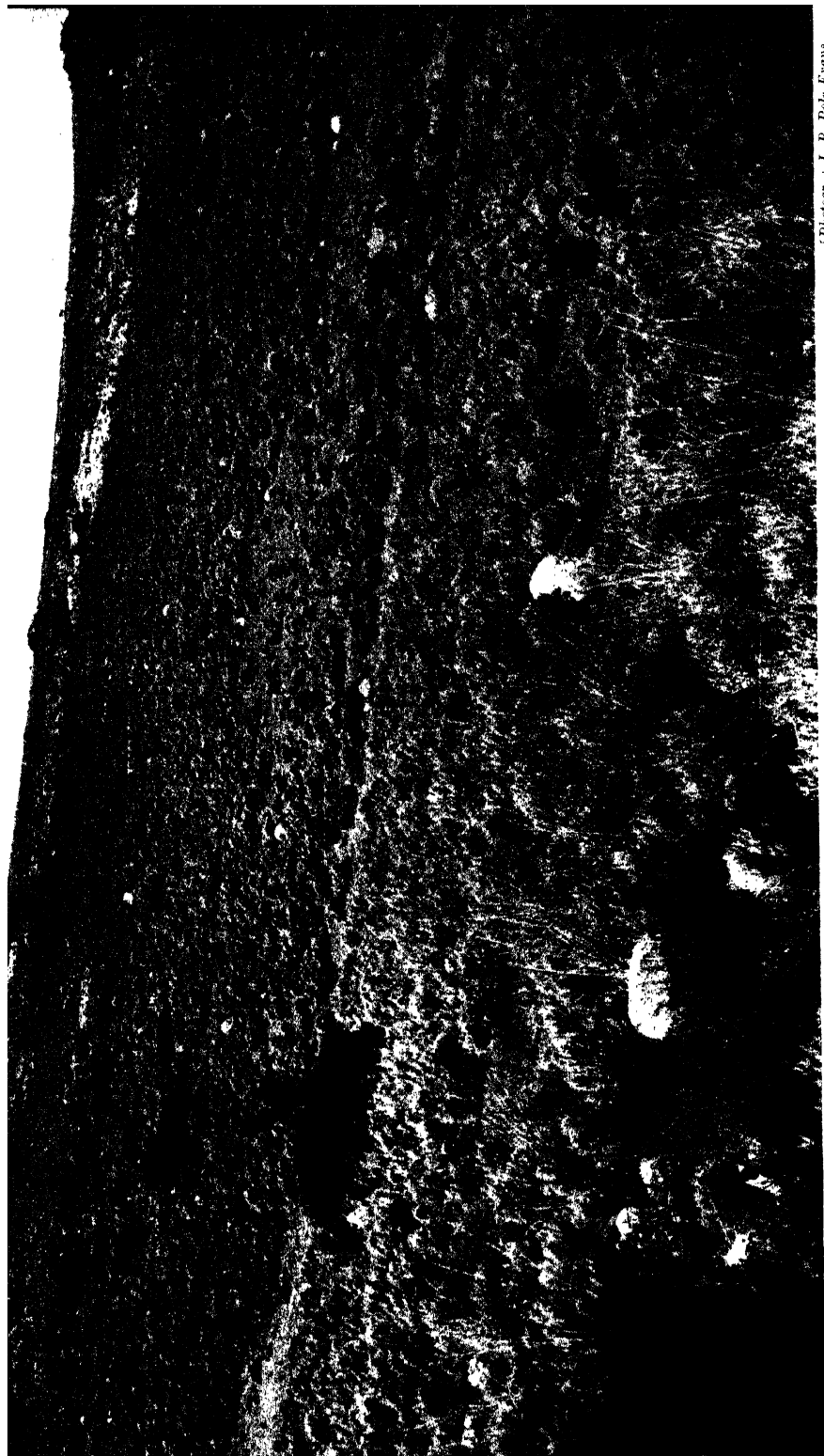


Fruits of *Pterocarpus angolensis* DC. (a) and *P. rotundifolius* (Sond.) Druce (b) (PAPILIONACEAE), in the Northern Transvaal.



The "Olijvenhout" or Wild Olive, *Olea verrucosa* Link (OLEACEAE), near Koegas, Prieska Division.

[Photogr. : I. B. Pold Evans



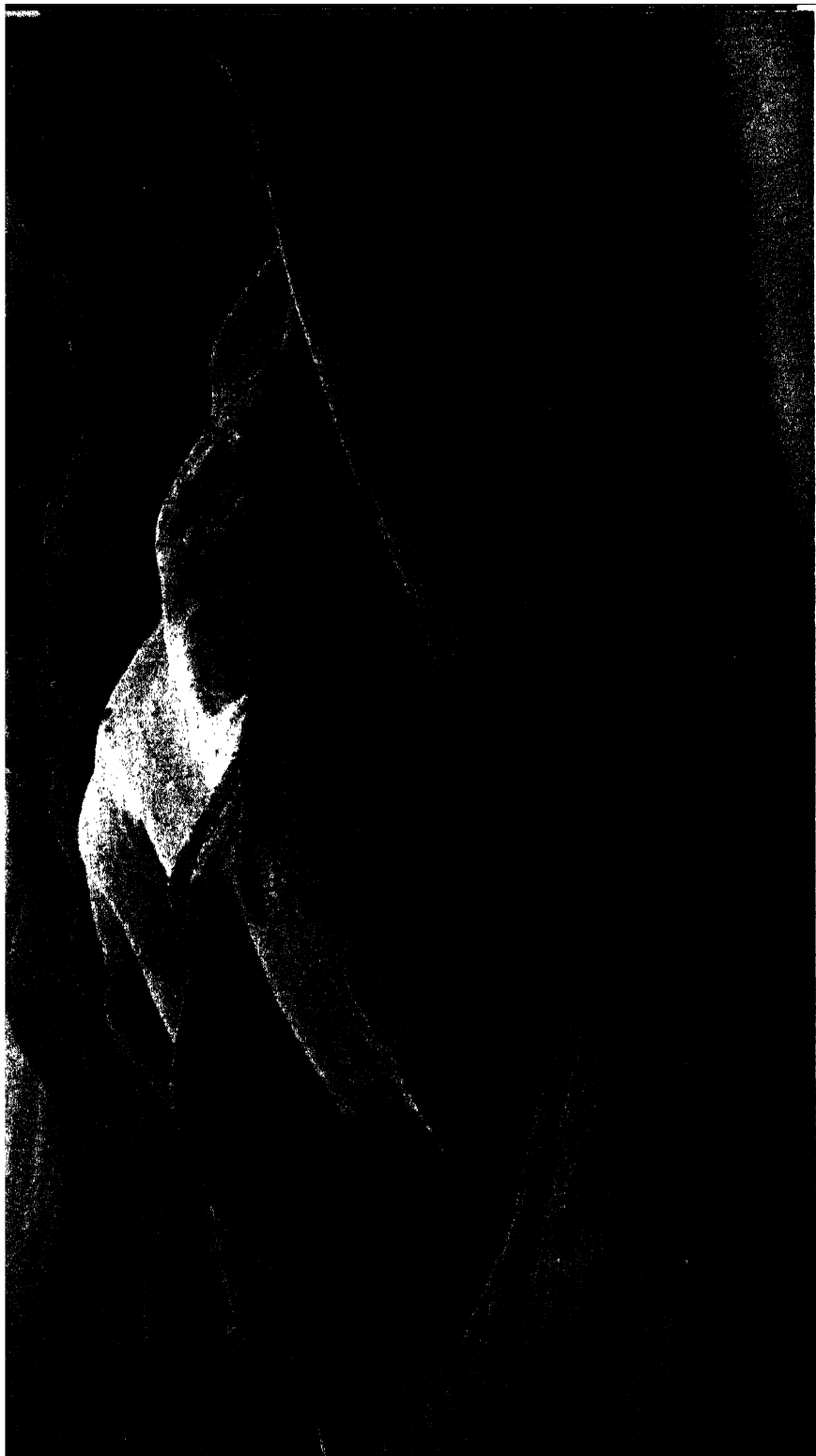
[Photogr. : I. B. Fode Evans.

The "Renosterbos", *Elytropappus rhinocerotis* Linn. (COMPOSITAE), near Grahamstown.



Photogr. : I. B. Poley Evans.

Stangeria eriopus (Kunze) Nash, a fern-like member of the CYCADACEAE in forest near Port St. John's.



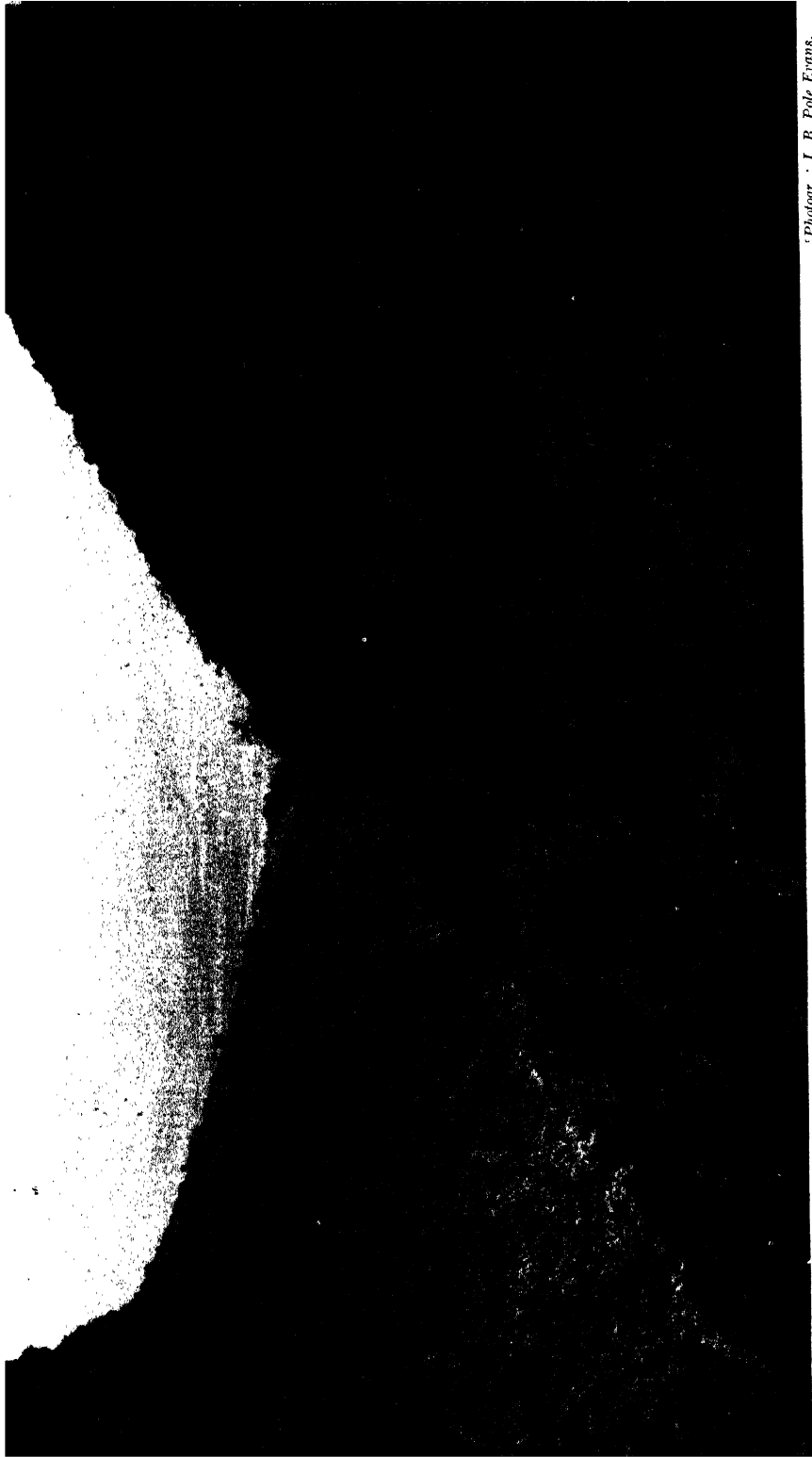
[Photogr. : J. B. Poole Evans.

The Drakensberg, near Barberton, North Eastern Transvaal, the home of the Barberton Daisy, *Gerbera Jamesonii* Bolus.



[*Photogr. : I. B. Pale Evans.*

Forest on the Drakensberg, near Haenertsburg, Northern Transvaal.



Photogr. : I. B. Fole Evans.

Forest on the Drakensberg, near Graskop, Eastern Transvaal.



[Photogr. : T. B. Pole Evans.

A "Mahogany" tree, *Azadirachta indica* Welw. (CAESALPINIACEAE), and small specimens of *Aloe Marlothii* A. Berg. (LILIACEAE), near Xinavane, Portuguese East Africa.

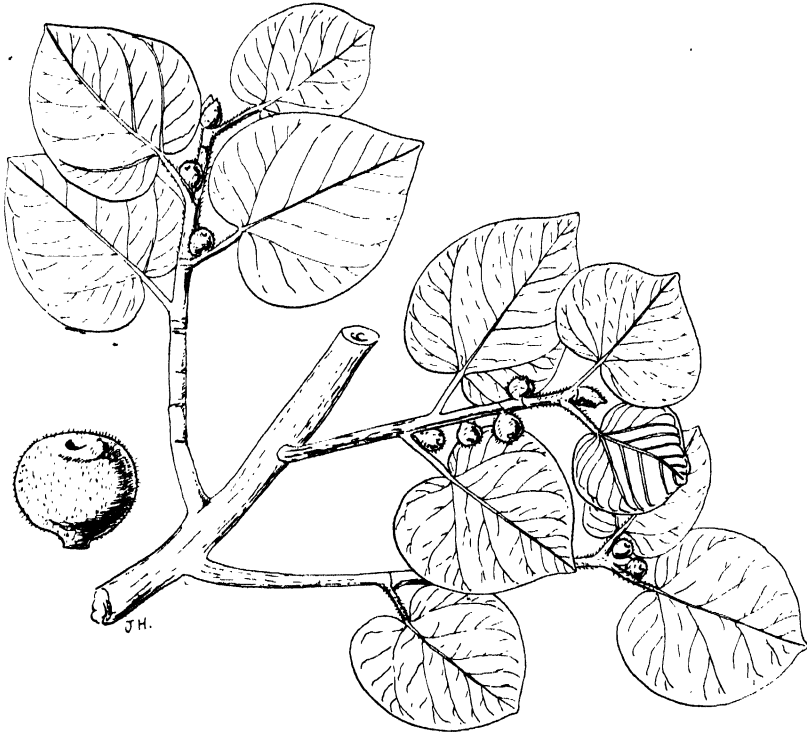


[Photogr. : I. B. Pole Evans.

The "Naboom", *Euphorbia Cooperi* N.E. Br. (EUPHORBIACEAE), near Komati Poort, Eastern Transvaal.

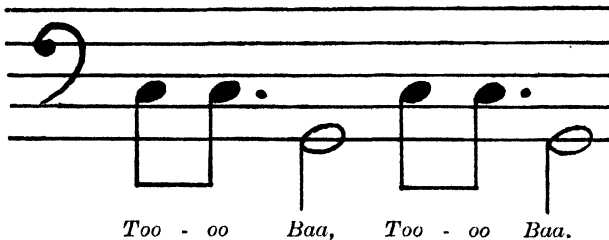
safely clustered together between me and the caravan, and probably more accustomed to roaring lions than I was.

I must confess that I was not a little scared to hear the beasts, and at first felt a creepy feeling somewhere down my spine ; but at the same



Ficus Smutsii Verdoorn (MORACEAE), from the Limpopo River.

time realised that I was having an experience such as fell nightly to the lot of the early travellers. Unfortunately I suddenly remembered that I had observed only one strand of barbed wire on that side of the compound between me and the lions.



To complete my discomfiture some old bull frogs kept up a noisy concert all night, and next morning I jotted down in my diary the sound of their "music" as well as I could imitate it (see above).



[Photogr. by the Author.

Our native camp cook, always a busy member of the party.



[Photogr. by the Author.

Bird watchers in the Zoutpansberg. Mr. Arthur Gillett and younger son.



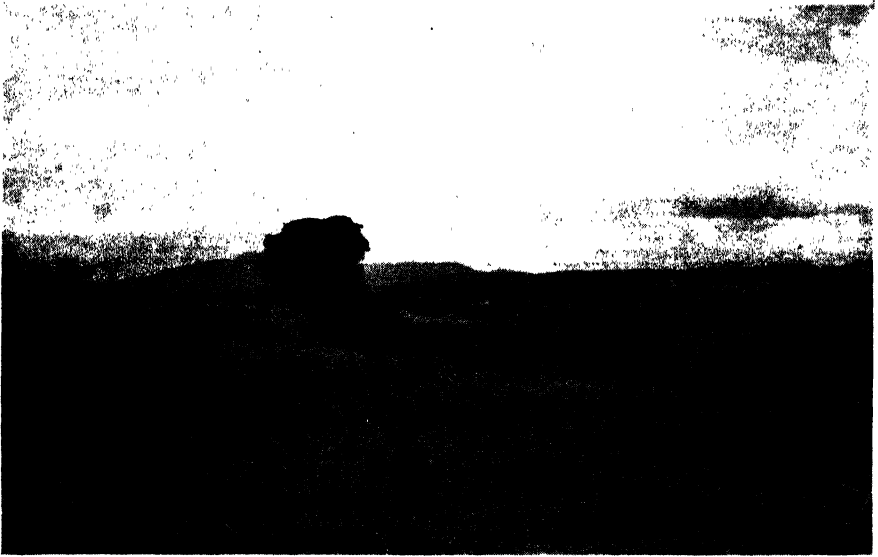
[Photogr. : I. B. Pole Evans, Sept. 1934.]

In the Zoutpansberg between Louis Trichardt and Sibasa, with trees of *Parinari curatellifolia* Planch. (ROSACEAE).



[Photogr. : I. B. Pole Evans, Sept. 1934.]

Albizzia sp. (MIMOSACEAE), and *Parinari mobola* Oliv. (ROSACEAE), with ever-green forests on mountain slopes between Louis Trichardt and Sibasa.



[Photogr. : I. B. Pole Evans, Sept. 1934.

Country around Elim, between Sibasa and Louis Trichardt. *Royena* (EBENACEAE) on the left, with large *Ficus* tree (MORACEAE), and *Parinari mobola* Oliv. (ROSACEAE) scrub below.



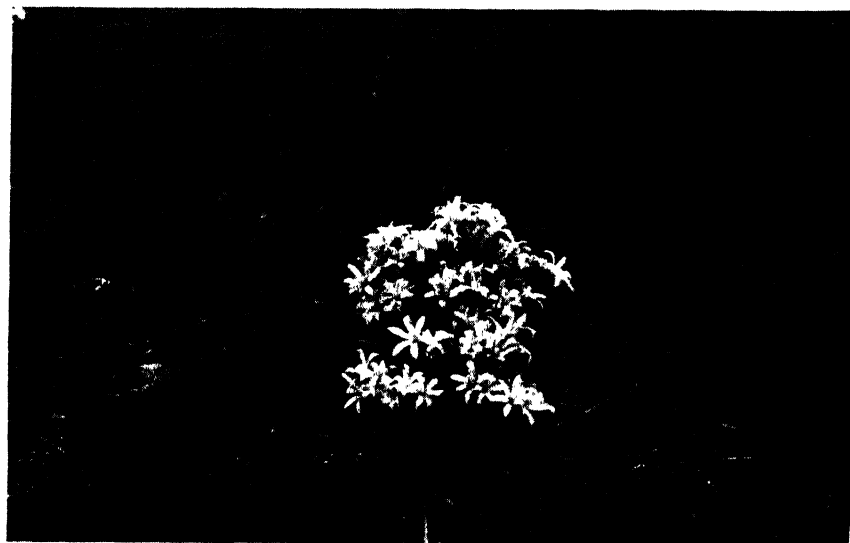
[Photogr. : I. B. Pole Evans, Nov. 1933.

Rhigozum spinosum Burch. (BIGNONIACEAE), between Pietersburg and Bandolier Kop.



[Photogr. : I. B. Pole Evans, Sept. 1934.

Gardenia globosa Hochst. (RUBIACEAE), between Louis Trichardt and Sibasa, Zoutpansberg.



[Photogr. : I. B. Pole Evans, Nov. 1933.

Vellozia retinervis Baker (VELLOZIACEAE), near Naboomspruit, Waterberg, Transvaal.



[Photogr. by the Author, Dec. 1928.]

Some of our party at Dongola, near the Limpopo River.



[Photogr. : I. B. Pole Evans, Oct. 1932.]

Commiphora africana Engl. (BURSERACEAE), in Mopane scrub at the Dongola Botanical Reserve, near Messina, Northern Transvaal.

We were up next day at 5.30, to see Pole Evans and the caravan off, and he kindly took all my full presses of plants back to Pretoria, where they were well cared for until my return. The rest of our party left at 7.30 for Messina, where we breakfasted with Mr. Emery, and turned south again on our way back to Pretoria. I had enjoyed our trip to the Limpopo immensely, in spite of the great heat. At Messina the temperature was 100° F. in the shade, but, being dry, was not very uncomfortable, and there was often a fresh breeze.

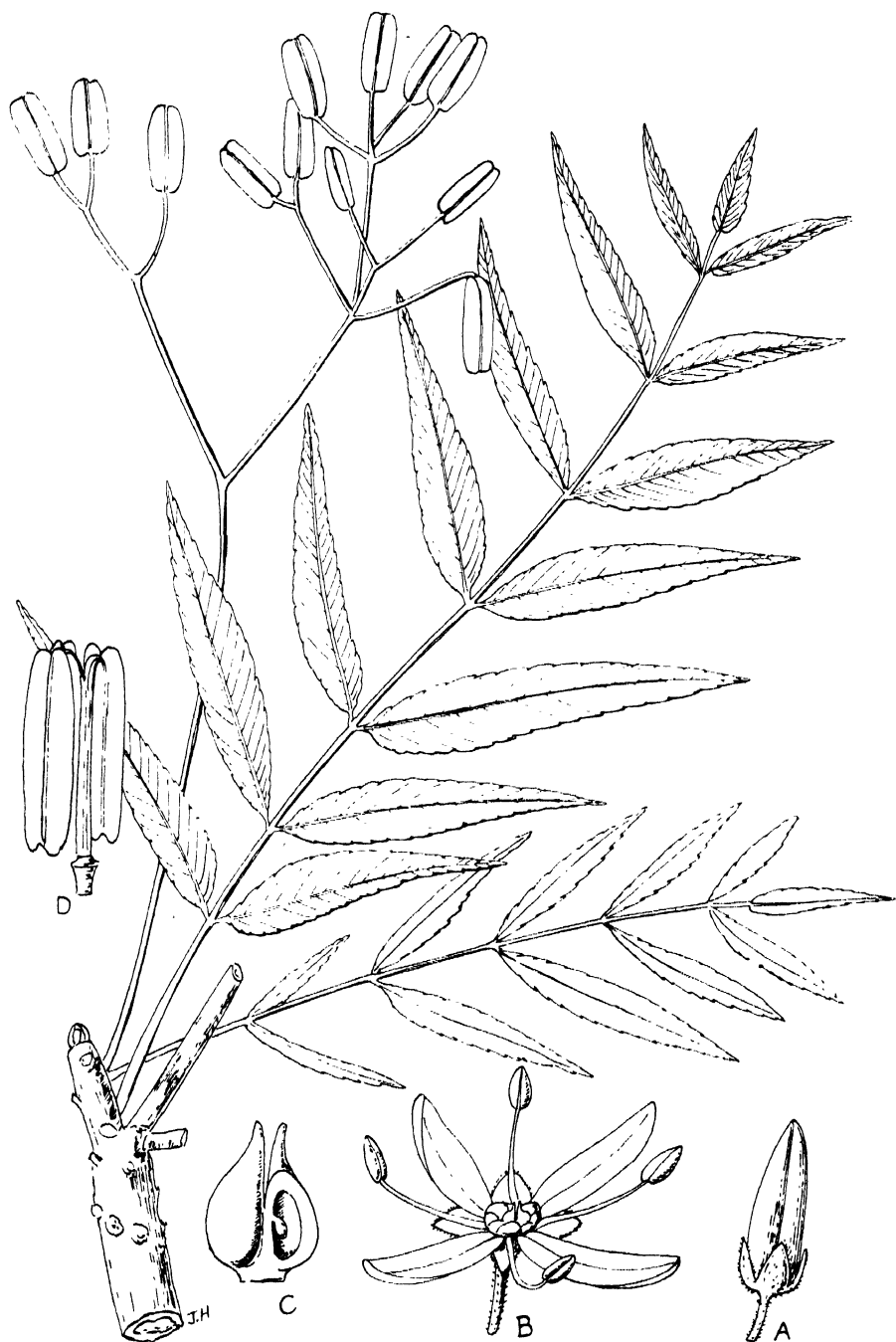
From the Limpopo to the Zoutpansberg the Mopane scrub and savannah country was constantly with us. It suddenly ceased 9 miles from Wylie's Poort, giving way to a considerable quantity of *Lonchocarpus capassa* Rolfe (PAPILIONACEAE) and species of *Acacia* (MIMOSACEAE), these occurring in moister and richer soil than the Mopane, and growing in an area which would probably be very suitable for cultivating tropical fruits of many kinds.

We had made a small collection on the Dongola Reserve,¹ among the more striking plants being *Nerine Bowdenii* W. Wats. (AMARYLLIDACEAE) (No. 2131), a handsome species with long stout pedicels and pink flowers; *Urginea altissima* Baker (LILIACEAE) (No. 2132), a very tall (about 6 ft.) species with numerous small white flowers, widely spread as far north as Upper Guinea in Tropical Africa; *Cleome diandra* Burch. (CAPPARIDACEAE) (No. 2133), with delicately cut digitate leaves, and bright-yellow flowers with only two stamens; *Terminalia prunioides* Laws. (COMBRETACEAE) (Nos. 2134, 2147), a small tree with arrested branchlets, narrowly obovate leaves and reddish, winged fruits; *Cordia ovalis* R.Br. (EHRETIACEAE) (No. 2144), a widely spread species with small almost orbicular scabrid leaves and clusters of polygamous flowers; *Sterculia Rogersii* N.E. Br. (STERCULIACEAE) (No. 2145).

Other interesting plants at Dongola were *Berchemia discolor* Hemsl. (RHAMNACEAE) (No. 2305), a small tree, leaves ovate-elliptic, bluntly acuminate, pale below, with 5-6 pairs of parallel lateral nerves, fruits oblong-ellipsoid, 1.5 cm. long, and *Acalypha fruticosa* Forssk. (EUPHORBIACEAE) (No. 2306), not so far recorded from South Africa, a shrub with oblong-lanceolate leaves sparsely gland-dotted below, and with rather large foliaceous bracts.

A conspicuous tree in the Northern Transvaal and northwards as far as Northern Rhodesia and South Nyasaland was *Kirkia acuminata* Oliv. (SIMARUBACEAE) (No. 2309) (see figure, p. 328), one of the most graceful trees on the veld, and resembling the mountain ash of Europe. Its wood makes strong poles and planks, and it may be propagated easily

¹ Also collected: No. 2135, *Vigna pongolensis* B. Davy (PAPILIONACEAE); 2136, *Commiphora africana* Arn. (SIMARUBACEAE); 2137, *Sericocoma avolans* Fenzl (AMARANTACEAE); 2138, *Ximenia americana* var. *microphylla* Welw. ex Oliv. (OLACACEAE); 2139, *Adansonia digitata* L. (BOMBACACEAE); 2141, *Acacia Seyal* Willd. (MIMOSACEAE); 2142, *Commiphora pyracanthoides* Engl. (BURSERACEAE); 2143, *Commiphora* sp.; 2146, *Ximenia americana* L. var. *microphylla* Welw. ex Oliv. (OLACACEAE); 2301, 2309, *Kirkia acuminata* Oliv. (SIMARUBACEAE); 2302, *Lonchocarpus Capassa* Rolfe (PAPILIONACEAE); 2303, *Copaifera Mopane* Kirk (CAESALPINIACEAE); 2304, *Ficus Sycomorus* Linn. (MORACEAE); 2307, *Phyllanthus reticulatus* Poir. (EUPHORBIACEAE); 2308, *Euclea lanceolata* E. Mey. (EBENACEAE); 2310, *Combretum apiculatum* Sond. (COMBRETACEAE); 2311, *Commiphora africana* Arn. (BURSERACEAE).



Kirkia acuminata Oliv. (SIMARUBACEAE), a conspicuous tree in the Northern Transvaal.

A, flower bud ; B, open flower ; C, carpels, one cut longitudinally ; D, fruit.

from cuttings. There are only two species ¹ of this genus, the second, *K. Wilmsii* Engl., having much smaller leaflets, and being found only in the Barberton and Waterberg districts.

Our number 2163 proved to be *Pretrea zanguibarica* (Lour.) J. Gay, belonging to the family PEDALIACEAE, a procumbent plant with pinnatifid leaves white below, solitary flowers on long pedicels, and *fructibus diabolicissimis* (Fig. C, this page). I give drawings of the outstanding fruits of this family which occur in South Africa, and which I hope will convey to the reader some of the stages leading up to the evolution of the remarkable Grapple fruit, *Harpagophytum procumbens* (Burch.) DC. (Fig. E), a troublesome plant to animals and to barefooted natives. *Harpagophytum* was first described by Burchell, and aptly named *Uncaria*, a name, however, previously used for a Rubiaceous genus. Livingstone remarked that when these fruits happen to hook



Fruits of different genera of the family PEDALIACEAE showing gradual evolution from the simple unarmed capsule of A, *Sesamum alatum* Thonn., to E, *Harpagophytum procumbens* (Burch.) DC.

B, *Rogeria longiflora* (Royen) J. Gay; C, *Pretrea zanguibarica* (Lour.) J. Gay; D, *Harpagophytum Peglerae* Stapf.

on to the mouth of an ox, the animal stands and roars with pain and a sense of helplessness. MacOwan ² writes graphically about this aspect. He says :—

“ A springbok, leaping and curvetting in the gladness of his heart, sets his foot down upon the capsule. The curved arms, elastic as whalebone, give a little, and the hoof comes down upon the tough seed-vessel. The hooks catch on all round the buck's hock and every kick and scuffle drives them farther into the flesh. The luckless beast is fairly shod with this grappler, and many a weary mile must he limp along in torment before he has trodden the thing into pieces and poached the seeds into the ground. And this is the way, at cost of much weariful agony to the antelopes, that the Grapple Plant ensures its seasonal life from year to year. One way or another, there is a good deal of cruelty in the Dark Continent.”

In Fig. A, the fruit of *Sesamum alatum* Thonn., is an unarmed capsule with no special means of dispersal. In Fig. B, *Rogeria longiflora*

¹ *Kirkia pubescens* Burt Davy is but a pubescent form, in my opinion.

² *Agricultural Journal, Cape of Good Hope*, 13 : 406 (1898).

(Royen), J. Gay, the fruit is a capsule with two small prickles on each valve but on one side of the fruit only. Further stages towards the Grapple fruit are shown in Fig. C, *Pretrea zanguebarica* (Lour.) J. Gay, and Fig. D, *Harpagophytum Peglerae* Stapf. In the latter it may be noted that the two prickles are slightly divided at the apex into knobs, like a battle-axe, whilst those of *H. procumbens*, though small, are tipped by a toothed, umbrella-like cap, providing further means of adherence to animals, and no doubt eventually serving also to anchor the fruit in the soil.

Chapter XVI

EXCURSION TO LAKE FUNDUSI AND WOODBUSH

ON our return to Louis Trichardt, in the Zoutpansberg, we decided to visit if possible a mysterious lake named Fundusi, about 30 miles to the east, in the heart of the mountains. Up to that time very few white people seem to have seen this lake, which is the largest in South Africa. The route leaves the main road to Wylie's Poort about 3 miles from Louis Trichardt, and penetrates a region of extreme beauty, reminding one of the country between Petworth and Midhurst in England, but with more expansive natural woodland and with low mountains on each side instead of hills. In place of the semi-arid region which one might expect in the middle of the Bushveld, here was a country as charming and beautiful as one could wish, the road at first passing through prosperous farms and later through native areas. The last few miles towards our destination will be long remembered, not only because of the narrowness and very bad surface of the "road", but also because of the bright colouring of *Bauhinia Galpinii* N.E. Br., one of South Africa's most beautiful and showy leguminous shrubs. It colours the side of the road a vivid red, and in the distance might pass for Azaleas planted in an English wood. After several stops to examine drifts, we at last reached "Thomson's Store", beyond which it was impossible to proceed by motor or any other conveyance on wheels. We spread our camp beds in front of the store, which is managed by an intelligent native, and were soon all snug for the night, much to the interest and amusement of the crowd of natives assembled on the stoep. As we were very tired after our journey, the kind offer of the native chief to entertain us with dancers was declined, but a little later a "one-eyed kaffir" appeared with a home-made stringed instrument and strummed tunes for a short time.

Next morning we started off about five o'clock for the lake, which was reached about ten o'clock, after an arduous climb over the mountains and descent on the other side. It is quite another story to climb a mountain in the moist heat of the north-eastern Transvaal in the middle of summer compared with a like ascent in the cool air of Wales or Scotland. We botanised by the way, and some of us had the novel experience of being carried over streams on the back of the sturdy Kaffir guide, appropriately named Titus, who insisted on performing this office for even the heaviest of the party. From the top of the ridge, about 4 miles from camp, we had a fine view of the lake below, some 3 to 4 miles away. It was seen by the well-marked line of vegetation that the lake was considerably below flood level—in fact, about 50 feet—the flats at the western end being covered by reeds and grass, through which a perennial stream winds its way. When at flood level, the lake must be nearly 3 miles long, and in places nearly three-quarters of a mile wide, and is apparently very deep. Our suspicions as to the presence of crocodiles were soon confirmed by seeing a number of brown shapes floating lazily on the surface. It was indeed tantalising to be

denied the pleasure of a bathe in such a delightful spot because of these reptiles.

General Smuts alone explored the farther end of the lake, whilst the remainder of the party botanised and rested. At that end an explanation of the origin of the lake is clearly evident. The shore is loosely strewn with huge boulders, the result of an enormous landslide which brought down a large section of the mountain slopes from the northern edge and filled up the narrow gorge through which the Matali river originally flowed eastwards to the Njelele. This dam-like wall is several hundred feet in height, and forms a more or less permeable barrier, through which the water gradually finds an outlet to the east. The upper rocks of the wall are covered with big trees, whose roots must go far down in order to reach the soil and water below. The gorge beyond the dam is similarly covered by a dense growth of trees and shrubs. It should be mentioned that these loosely piled boulders and stones are



Bauhinia Galpinii N.E. Br. (CAESALPINIACEAE), with beautiful red flowers;
in the Zoutpansberg.

A, stamens and pistil; B, vertical section of pistil; C, fruit.



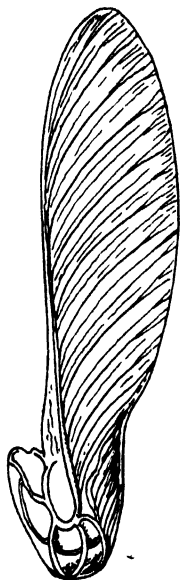
Lake Fundusi, Zoutpansberg, N. Transvaal. [Photogr.: V. A. Wager.]

traversed at considerable risk, for the chasms and interstices between them are in places very dangerous, and would prove fatal to anyone who inadvertently fell therein. A short account of Lake Fundusi by T. G. Trevor will be found in the *Transactions of the Royal Society of South Africa*, vol. 8, pp. 87–89 (1919). This includes a rough sketch of the lake at a considerably higher level than at the time of our visit.

I give a systematic list of the plants collected on this excursion, between Thomson's Store and Lake Fundusi, 21 December, 1928.



Lake Fundusi, Zoutpansberg, N. Transvaal. [Photogr.: V. A. Wager.]



Securidaca longipedunculata Fres. (POLYGALACEAE), from the Zoutpansberg; a species widely spread in Tropical Africa.

LIGNOSAE (WOODY DICOTYLEDONS)

- ROSACEAE**—*Parinari curatellifolia* Planch. (Nos. 2184, 2206): tree; leaves small, elliptic, with spreading parallel nerves, tomentose below; fruits subglobose, 3 cm. long.
- Agrimonia Eupatoria Linn. (No. 2204).**
- CAESALPINIACEAE**—*Bauhinia Galpinii* N.E. Br. (*B. punctata* Bolle not of Burch. ex Benth.) (No. 2162): low bush with twin lobed leaves cordate at the base, and short terminal racemes of showy scarlet flowers, the petals long-clawed.
- MIMOSACEAE**—*Dichrostachys glomerata* (Forssk.) Chiov. (No. 2297) (see p. 298).
- PAPILIONACEAE**—*Pterocarpus angolensis* DC. (No. 2167): tree, 20 ft.; fruits orbicular, winged, densely setose in the middle (see figure, p. 320). *Indigofera, perplexa* N.E. Br. (No. 2185): silvery undershrub; flowers pink.
- FLACOURTIACEAE**—*Trimenia grandifolia* (Hochst.) Warb. (No. 2153): shrub; leaves suborbicular, obtuse, dentate, 5-nerved from the base; young fruits in catkin-like inflorescences.
- CAPPARIDACEAE**—*Cleome maculata* (Sond.) Burt. Davy (No. 2195): leaflets 3, linear; flowers small, pink; fruits linear, ribbed.
- POLYGALACEAE**—*Securidaca longipedunculata* Fres. (No. 2205): shrub; fruits winged (see figure, this page). *Polygala Rehmannii* Chod. (No. 2187): herb; leaves linear, glabrous; petals green-veined.
- TILIACEAE**—*Corchorus pongolensis* B. Davy and Greenway (No. 2190). *Grewia hexamita* Burret (No. 2298): leaves very obliquely cordate at the base, softly tomentose; flowers large, subsolitary. *G. flava* DC. (No. 2299): leaves glaucous and softly tomentellous below; flowers few together, small (about 1 cm. long).
- STERCULIACEAE**—*Waltheria americana* L. (No. 2192): a common weed.
- MALVACEAE**—*Abutilon angulatum* Mast. (No. 2200): shrub with ovate-orbicular softly and densely tomentellous leaves and rose flowers. *Hibiscus cordatus* Harv. (No. 2191): stems setose with long stellate hairs and with shorter hairs; leaves triangular, cordate; flowers axillary, long-pedicellate, with a very small epicalyx.
- MALPIGHIACEAE**—*Sphegamnocarpus galphimifolius* Szysz. (No. 2156): twiner with small oblong leaves sparsely pubescent with medifixed hairs and yellow flowers, the petals clawed.
- EUPHORBIACEAE**—*Pseudolachnostylis maprouneifolia* Pax (No. 2203) (see p. 296). *Acalypha peduncularis* E. Mey. (No. 2160): stems simple, herbaceous; male spikes long-pedunculate; leaves sessile, oblong, crenate. *Dalechampia capensis* Spreng. f. (No. 2189): twiner; leaves digitately 5-lobed, puberulous on the nerves below; female bracts pectinate, plumose. *Bridelia mollis* Hutch. (No. 2300) (see figure, p. 313).
- COMBRETACEAE**—*Terminalia prunioides* Laws. (No. 2296): lateral branchlets short and arrested, bearing tufts of narrowly obovate leaves and short racemes of small pale-yellow flowers. *Combretum Kraussii* Hochst. (No. 2199).
- OLACACEAE**—*Ximenia americana* Linn. var. *microphylla* (No. 2207): shrub with short spine-tipped branchlets, smallish pubescent oblanceolate leaves, and hard ellipsoid fruits 2.5 cm. long.
- AMPELIDACEAE**—*Cissus Woodii* Gilg & Brandt (No. 2161): leaflets ovate-lanceolate, acuminate, softly pubescent below; panicle thyrsoid.
- MYRSINACEAE**—*Maesa rufescens* A.DC. (No. 2152): shrub; leaves broadly elliptic, irregularly crenate, with glandular streaks; flowers small, paniculate.
- MELIACEAE**—*Ekebergia Meyerii* Presl (No. 2165): a tree with pinnate leaves; entire ovate-lanceolate leaflets, and hairy corollas.

- SAPINDACEAE—**Cardiospermum Halicacabum** var. **microphyllum** *Blume* (No. 2154): herbaceous twiner with compound leaves.
- APOCYNACEAE—**Rauwolfia caffra** *Sond.* (No. 2202): leaves narrowly oblanceolate, very acute at both ends, with numerous spreading lateral nerves; fruits fleshy, 1 cm. diam. **Holarrhena febrifuga** *Klotzsch* (No. 2201): a twiner with elliptic slightly pubescent leaves, and leaf-opposed close cymes of reddish flowers.
- RUBIACEAE—**Randia rudis** *E. Mey.* (No. 2158): a small shrub in fruit, with short arrested lateral branchlets, small obovate pubescent leaves and small globose fruits the size of a pea. **Pavetta Eylesii** *S. Moore* (No. 2198). **Cephalanthus natalensis** *Oliv.* (No. 2159): straggling shrub or scandent; leaves small, oblong-elliptic; flowers in small globose heads.
- VERBENACEAE—**Vitex Rehmannii** *Gürke* (No. 2148): small tree; leaves 5-foliolate, leaflets narrowly lanceolate, acute, puberulous below; flowers mauve, in small dichotomous cymes.

HERBACEAE (HERBACEOUS DICOTYLEDONS)

- GENTIANACEAE—**Chironia transvaalensis** *Gilg* (No. 2164): herb 1½ ft.; leaves narrowly lanceolate, gradually acute; flowers deep pink in lax cymes.
- COMPOSITAE—**Ethulia conyzoides** *L.* (No. 2194): flowers mauve, in dense terminal corymbs. **Denekia capensis** *Thunb.* (No. 2196), like the last, but leaves white-cobwebby below. **Nidorella senecionidea** *DC.* (No. 2188): heads small, golden-yellow, in dense clusters. **Gerbera Jamesonii** *Bolus.* (No. 2149): leaves lyrate, white below; rays scarlet.
- SCROPHULARIACEAE—**Striga Forbesii** *Benth.* (No. 2186): flowers few, solitary and axillary, orange-red, calyx with lines of tubercles.
- PEDALIACEAE—**Pretrea zanguebarica** (*Lour.*) *J. Gay* (Nos. 2163, 2193): stems prostrate; leaves deeply lobed, densely whitish papillose-puberulous below; flowers solitary on slender pedicels, mauve; fruits boat-shaped, with two stout prickles on one side (see figure, p. 329).

MONOCOTYLEDONS

- SMILACACEAE—**Smilax Kraussiana** *Meisn.* (No. 2155): climber; stems armed with short recurved prickles; leaves ovate-elliptic, acute, 3-nerved; flowers clustered on a short peduncle.
- AMARYLLIDACEAE—**Crinum longifolium** *Herb.* (No. 2151): flowers white with a long slender tube.
- ORCHIDACEAE—**Eulophia Krebsii** *Reichb. f.* (No. 2150): about 3 ft. high; flowers cream-yellow in lax racemes; fruits deflexed. **Satyrion ocellatum** *Bolus* (No. 2166): 2–2½ ft. high; flowers white, in dense spikes.
- CYPERACEAE—**Flmbristylis squarrosa** *Vahl* (No. 2197): tufted; leaves and peduncles filiform; spikelets 8 mm. long, with acute spreading glumes.
- GRAMINEAE—**Echinochloa stagnina** *Beaur.* (No. 2157): panicle oblong, with few short branches and long scabrid awns.

Some of us were very tired by the arduous day at Lake Fundusi, and we were not very keen to go farther in the cars when we returned to the Store at four o'clock. It was decided to leave soon afterwards, however. On the way down the native schoolmaster had a class of children in European dress lined up in honour of our famous leader. They sang simple songs and clapped their hands as we passed.

We camped at Witvlag that evening in a grove of trees, and I was not a little disturbed to find my bed pitched right across the trail of a python, which I hoped would not return the way it had gone. I was too tired, however, to bother much one way or the other.



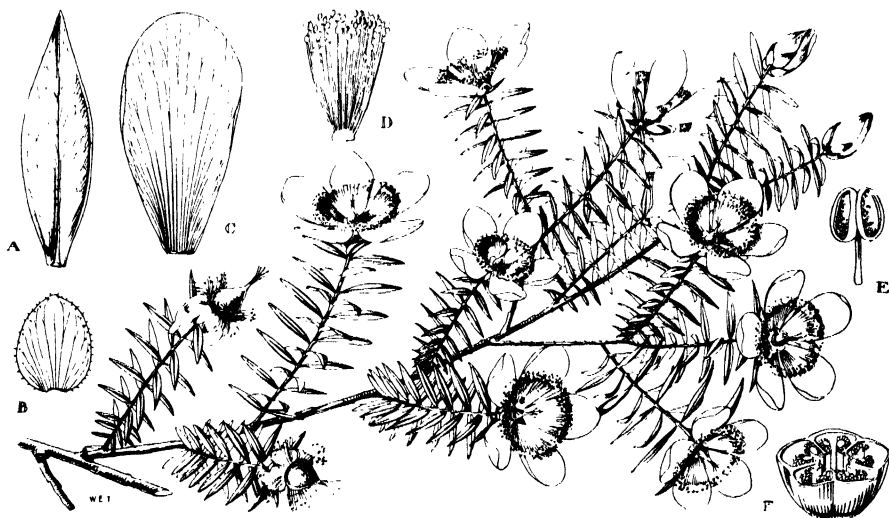
A full plant press, with Mrs. Gillett, General Smuts and the Author.

At Witvlag¹ we were able to add only a few plants to the press, the more striking being *Crossandra Greenstockii* S. Moore (ACANTHACEAE) (No. 2168), with oblong-oblanccolate leaves and long-pedunculate spikes of salmon-coloured flowers; *Gerbera Jamesonii* Bolus (COMPOSITAE) (No. 2169) (see p. 335); *Pterocarpus rotundifolius* (Sond.) Druce (*P. sericeus* Benth.) (PAPILIONACEAE) (No. 2175) (see p. 320); *Annona chrysophylla* Boj. var. *porpetac* (Baill.) Robyns and Ghesq. (ANNONACEAE) (No. 2176), with elliptic-orbicular leaves and pseudo-syncarpous ovoid fruits; *Ficus Sonderi* Miq. (MORACEAE) (No. 2178); *Antidesma venosum* Tul. (No. 2179), a small tree with broadly elliptic leaves and often galled catkins; *Crinum longifolium* Thunb. (AMARYLLIDACEAE) (No. 2180); leaves several to each bulb, acuminate, glaucous; flowers tinged with red, 6-12 to each umbel; *Faurea Galpinii* Phillips (PROTEACEAE) (No. 2181), a tree with lanceolate leaves and short racemes of pubescent flowers; *Terminalia sericea* Burch. (COMBRETACEAE) (No. 2182) (see p. 295).

¹ Also collected: No. 2170, *Panicum maximum* Jacq. (GRAMINEAE); 2171, *Lactuca capensis* Thunb. (COMPOSITAE); 2172, *Clerodendrum lanceolatum* Gürke (VERBENACEAE); 2173, *Pachycarpus validus* N.E. Br. (ASCLEPIADACEAE); 2174, *Senecio latifolius* DC. (COMPOSITAE); 2177, *Tragus Berteronianus* Sch. (GRAMINEAE); 2183, *Orthosiphon serratus* Schltr. (LABIATAE); 2249, *Peltophorum africanum* Sond. (CAESALPINIACEAE); 2250, *Ilex mitis* Radlk. (AQUIFOLIACEAE); 2251, *Gardenia Neuberia* Eck. & Zeyh. (RUBIACEAE); 2252, *Adenia senensis* (Klotzsch) Engl. (PASSIFLORACEAE); 2253, *Rhus Legatii* Schönk. (ANACARDIACEAE); 2254, *Scilla natalensis* Planch. (LILIACEAE); 2255, *Cussonia natalensis* Sond. (ARALIACEAE); 2256, *Cyathea Dregei* Kze. (FILICES); 2257, *Curtisia faginea* Thunb. (CORNACEAE); 2258, *Combretum gazense* Swynnerton & Bak. f. (COMBRETACEAE); 2259, see p. 337; 2260, *Impatiens sylvicola* B. Davy (Balsaminaceae); 2261, *Selago villosa* Rolfe (SELAGINACEAE).

A good find was *Streptocarpus parviflorus* Hook. f. (GESNERIACEAE) (No. 2259), growing on old dead trees, with a rosette of elongated obtuse crenate leaves softly pubescent below, and small cymes of white flowers.

We returned without stopping to Louis Trichardt and proceeded to Pietersburg, where we stayed the night. The next morning (23rd December) we started early for Woodbush (Houtbosh), where there is a large patch of evergreen forest similar to that at Knysna and along the escarpment of the Drakensberg. On the way we collected a few interesting plants on the veld 6 to 8 miles east of Pietersburg,¹ including



Hypericum lanceolatum Lam. (HYPERICACEAE), widely spread on the mountains of Tropical Africa.

A, leaf; B, sepal; C, petal; D, bundle of stamens; E, anther; F, cross section of ovary. — From Hutch. & Dalz. *Fl. West Trop. Africa*.

an undescribed species of *Ipomoea* found about here by Bolus (No. 10,924) in February 1904. I have called this *Ipomoea uncinata* Hutch.² from the small hook-tipped leaves, the stems being numerous and prostrate from a woody rootstock, the mauve flowers shortly pedicellate and scattered along the stems, and very pretty.

At Woodbush we called on the forest officer, who accompanied us

¹ Also collected: 2286, *Zizyphus helvola* Sond. (RHAMNACEAE); 2287, *Cassia obovata* Collad (CAESALPINIACEAE); 2288, *Pterodiscus speciosus* Hook. (PEDALIACEAE).

² *Ipomoea uncinata* Hutch., sp. nov.

Rhizoma lignosum, circiter 1 cm. crassum; caules numerosi, prostrati, simplices, pubescentes. Folia ovato-lanceolata, valde recurvata, apice sub-uncinata, usque ad 2 cm. longa et 1 cm. lata, pubescentia; nervi laterales utrinsecus circiter 5; petioli 1 mm. longi. Flores pallide caerulei, axillares, solitarii; pedicelli 0.5-1 cm. longi, apicem versus bibracteati, bracteis linearibus 4 mm. longis viridibus. Sepala late lanceolata, leviter inaequalia, ad 1.3 cm. longa, acuminata, exteriora leviter pubescentia. Corolla 5 cm. longa, glabra. Stamina prope basin corollae inserta; antherae 5 mm. longae, basi sagittatae. Stylus 1 cm. longus, stigmatibus crassis recurvatis.

Transvaal: open veld 6-8 miles east of Pietersburg, 23 December, 1928, Hutchinson 2285 (type in Kew Herbarium); open places between Pietersburg, Sandloop and Woodbush, 4100-4500 ft., February 1904, H. Bolus 10924.

down the steep gradient amidst beautiful scenery with very tall trees and rich climbing undergrowth. We gathered an *Impatiens*, *I. sylvicola* B. Davy & Greenway (No. 2260) by the roadside, and on an open hillside I was very pleased to see growing small trees of the widely spread *Hypericum lanceolatum* Lam. (No. 2211), which occurs on nearly all the East African mountains, and even on Cameroons Mountain, where I collected it in April 1937. I give a figure ¹ as used in the *Flora of West Tropical Africa*. A further specimen of *Streptocarpus parviflorus* Hook f. was also gathered (No. 2246).

In wet places occurred a fine Scrophulariaceous plant, *Phygellius capensis* E. Mey. (No. 2262), with long panicles of yellowish-green flowers with long thread-like styles persistent in fruit. According to the *Flora Capensis*, this should be named *P. aequalis* Harv. ex Hiern, but I do not believe there are two species of this genus. At any rate I cannot distinguish them in the herbarium, and regard the second name as synonymous.

I should like to have stayed longer at Woodbush because of its phytogeographical interest, but Christmas day was very close, and we were due back at Pretoria before then. Our collection is shown as follows in systematic order :—

Plants Collected at Woodbush (Houtbosch), 23rd December, 1928

FILICES—*Cyathea Dregei* Kze. (No. 2236) : tree-fern 12 ft. high ; frond bipinnate ; leaflets pinnatifid, obliquely oblong ; sori paired at the base of the segments.

LIGNOSAE (WOODY DICOTYLEDONS)

ANNONACEAE—*Xylopia Antunesii* var. *shirensis* Engl. & Diels (No. 2240) : shrub ; leaves elliptic or oblong-elliptic, thinly pubescent below ; flowers 1·1·5 cm. long, silky-tomentose ; fruits striate, 3-4-seeded.

EBENACEAE—*Euclea lanceolata* E. Mey. (No. 2222) : shrub ; leaves oblanceolate, slightly undulate.

PAPILIONACEAE—*Crotalaria capensis* Jacq. (No. 2247) : shrub ; leaves trifoliate, leaflets obovate, slightly pubescent on the nerves ; flowers yellow ; fruits oblong, bladdery, minutely pubescent. *Vigna vexillata* Benth. (No. 2210) : climber ; stems hirsute, with reflexed hairs ; stipules not peltate, ovate-lanceolate ; leaflets ovate, acute, reticulate, setulose-pubescent. *Aeschynomene Rehmannii* Schinz (No. 2216) : slender shrub ; leaflets oblong, mucronate, nervose, glabrous ; racemes longer than the leaves, branched. *Desmodium setigerum* Benth. (No. 2245) : slender undershrub in dense shade of woods, with slender racemes of small pink flowers.

FLACOURTIACEAE—*Rawsonia lucida* Harv. & Sond. (No. 2237) : shrub ; leaves oblong, sharply serrate ; fruits globose, 2·5 cm. diam. *Trimeria grandifolia* (Hochst.) Warb. (Nos. 2224, 2272) : shrub ; leaves rounded, crenate-dentate, 5-7-nerved at the base ; flowers small in catkin-like inflorescences.

VIOLACEAE—*Viola abyssinica* Steud. (No. 2228) : slender herb ; leaves ovate ; flowers axillary, like a small British violet.

TURNERACEAE—*Wormskiolidia longipedunculata* Mast. (No. 2233) : herb from a woody rootstock ; stems densely setose, with purplish hairs ; inflorescence few-flowered, long-pedunculate ; flowers red, like a Crucifer.

EUPHORBIACEAE—*Phyllanthus Burchellii* Müll. Arg. (Nos. 2209, 2230) : stems about 1 ft. long, from a woody stock ; leaves broadly elliptic, glabrous ; stamens 5, free. *Erythrococca Menyharthii* (Pax) Prain (No. 2235) : shrub, thinly pubescent ; leaves broadly ovate-elliptic, acuminate, obtusely

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acuminate, biglandular at the base. **Cluytia affinis** Sond. (No. 2264): shrub; branches densely leafy; leaves oblong-ob lanceolate, pubescent; male flowers axillary, subsessile, clustered. **Andrachne ovalis** Müll. Arg. (No. 2279): slender shrublet; leaves ovate, pale green, thin; male flowers on slender axillary pedicels, green. **Euphorbia transvaalensis** Schltr. (No. 2241): herb with distant nodes, obovate leaves, and solitary or subsolitary involucre.

HYPERICACEAE—**Hypericum lanceolatum** Lam. (Nos. 2211, 2243, 2273): shrub, much branched; leaves narrowly lanceolate; small, not visibly gland-dotted; flowers yellow, fairly large and showy. **H. aethiopicum** Thunb. (No. 2231): small many stemmed herb, with small lanceolate gland-dotted leaves and small yellow flowers.

MYRTACEAE—**Eugenia natalitia** Sond. (No. 2239): leaves broadly elliptic, bluntly acuminate, gland-dotted and with an intra-marginal nerve; flowers axillary, few, small.

COMBRETACEAE—**Combretum Kraussii** Hochst. (No. 2276): leaves oblong-ob lanceolate, papillous on the midrib below; young fruits puberulous.

OLACACEAE—**Apodytes dimidiata** E. Mey. (No. 2221): shrub; leaves elliptic, glabrous; flowers small in short dense panicles.

SANTALACEAE—**Thesium asterias** A. W. Hill (No. 2232a).

MYRSINACEAE—**Rapanea melanophlebos** Mez (No. 2271): shrub; leaves oblanceolate, with numerous lateral nerves; fruits shortly stalked, globose, the size of a small pea.

RUTACEAE—**Clausena inaequalis** (DC.) Benth. (No. 2223): a small tree; leaves pinnate, leaflets obliquely and narrowly ovate, crenulate, densely gland-dotted.

SIMARUBACEAE—**Kirkia acuminata** Oliv. (No. 2223a): elegant small tree, leaflets similar to preceding but not gland-dotted; flowers small in axillary cymes (see p. 328).

ANACARDIACEAE—**Rhus** sp. (No. 2277): small tree; leaves appressed-pubescent on both surfaces; leaflets obovate; flowers greenish, very small, in panicles.

LOGANIACEAE—**Lachnopylis** sp.: too young; young shoots stellate-tomentose; leaves elliptic, stellate-pubescent below.

APOCYNACEAE—**Carissa bispinosa** (Linn.) Desf. (No. 2266): shrublet; leaves broadly ovate, mucronate; spines shortly bifurcate; flowers small, white, in a terminal cluster.

ASCLEPIADACEAE—**Tylophora Flanaganii** Schltr. (No. 2280): climber; leaves ovate, acute, rounded at the base, glabrous; flowers small, paniculate, pedicels slender.

RUBIACEAE—**Gardenia Rothmannia** Linn. f. (No. 2278): tall shrub; stipules acuminate; leaves oblong-elliptic, acuminate; flowers creamy-white, with long narrow calyx-lobes. **Fadogia monticola** Robyns (No. 2219): stems simple from a rhizome; leaves lanceolate, whorled, densely papillous below; flowers axillary, clustered, yellow. **Canthium Mundtianum** Cham. & Schl. (No. 2225): shrub; leaves broadly elliptic; fruits obliquely ellipsoid, 0.8 cm. long. **Borreria natalensis** (Hochst.) K. Schum. (No. 2267): herb with narrow sessile leaves and dense axillary clusters of small greenish flowers.

VERBENACEAE—**Clerodendrum triphyllum** Harv. (No. 2217): stems simple from a rhizome; leaves in whorls of 3, narrowly oblanceolate, entire; glabrous. **C. hirsutum** (Hochst.) Pears. (No. 2275): dwarf; leaves oblanceolate, shortly pubescent; flowers pink, solitary or paired.

HERBACEAE (HERBACEOUS DICOTYLEDONS)

MENISPERMACEAE—**Cissampelos torulosa** E. Mey. (No. 2244): twiner; leaves very slightly peltate, reniform; flowers minute, in small cymes on slender peduncles—distributed from the forests of George northwards to the Shire Highlands in Nyasaland. **Stephania abyssinica** (Dill. & Rich.) Walp. (No. 2281): climber; leaves peltate, rounded-ovate, glaucous and finely reticulate below; flowers very small, in axillary cymes.

LOBELIACEAE—**Lobelia stellaroides** Benth. & Hook. f. (No. 2265): slender diffuse herb; leaves opposite, lanceolate; flowers axillary, solitary, mauve.

- COMPOSITAE—**Aster muricatus** Less. (No. 2234): tiny shrublet with acicular setulose-pubescent leaves, and long-pedunculate rather small heads with yellow rays. **Helichrysum cephaloideum** DC. (No. 2215): radical leaves oblong-lanceolate, densely woolly; stem-leaves linear-lanceolate, woolly; heads pale yellow, densely glomerate. **Dichrocephala integrifolia** (L. f.) O.Ktze. (No. 2263): weedy herb with pinnately partite leaves, the end segment ovate, sharply toothed; heads few, small, greenish. **Vernonia Sutherlandii** Harv. (No. 2248): stems simple from a rhizome, laxly leafy; leaves subsessile, elliptic, acute, with few teeth, pubescent; corymbs long-pedunculate, few-headed, heads purple. **Gerbera Kraussii** Sch. Bip. (No. 2218): leaves radical, long-petiolate, obovate, entire, densely pilose above, white-woolly below.
- SOLANACEAE—**Solanum aculeatissimum** Jacq. (No. 2227): stems very densely prickly; leaves pinnately lobulate, pilose, prickly on the nerves.
- SCROPHULARIACEAE—**Phygellus capensis** E. Mey. (No. 2262). **Harveya coccinea** Schltr.? (No. 2274): an almost leafless saprophyte, drying black; flowers pink. **Buchnera brevibractealis** Hiern. (No. 2242): slender herb with very narrow slightly scabrid leaves; inflorescence very short and subcorymbose.
- GESNERIACEAE—**Streptocarpus parviflorus** Hook. f. (No. 2246): leaves several, woolly below; flowers white.
- ACANTHACEAE—**Thunbergia natalensis** Hook. (No. 2208): herb; leaves sessile, ovate, subentire; flowers solitary, axillary, subsessile; bracts 2 cm. long, nervose; corolla mauve; fruits long-stalked, beaked. **T. atriplicifolia** Drège (No. 2122): herb; leaves narrowly ovate, mucronate, 5-nerved at the base, entire, thinly pilose; bracts 2 cm. long.
- LABIATAE—**Stachys Rehmannii** Skan (No. 2232): herb with ovate-rounded subsessile crenate leaves and few mauve flowers. **Hemizygia Obermeyeriae** Ashby (No. 2238): leaves oblong-elliptic, rugose, woolly below with crisped white hairs; bracts crimson or mauve.



[Photogr. by the Author.]

One of our cars stuck in an awkward spot; General Smuts looks on.

MONOCOTYLEDONS

COMMELINACEAE—**Commelina Eckloniana** Kunth (No. 2229) : slender herb ; leaf-sheaths pilose, blades linear, shortly pilose ; flowers exserted from the bract, pale mauve. **Cyanotis nodiflora** Kunth. (No. 2269) : leaves elongate-linear, softly pilose ; bracts narrowly ovate-acuminate, spreading ; flowers mauve, in heads.

IRIDACEAE—**Gladiolus purpureo-auratus** Hk. f. (No. 2268) : about 2 ft. ; flowers reddish, speckled.

ORCHIDACEAE **Disa stachyoides** Rchb. f. (No. 2214) : nearly 1 ft. high ; leaves linear, cauline ; spur short and stumpy, nearly as long as the limb. **Satyrium longicauda** Lindl. (No. 2220) : 1-1½ ft. high ; leaves oblong, about 9-nerved ; spur 3 cm. long, slender.

I shall not readily forget our drive back from Woodbush to Pietersburg, for whilst still about 5 miles from the latter place a widespread storm which we had seen approaching from the south caught us up, and we were soon enveloped in a torrent of rain, the pitch darkness



General Smuts (left) on his Rooikop Farm.

being illuminated by vivid flashes of lightning. I was amazed at the way General Smuts followed the road to the town, for from the back seat I could see nothing at all, whilst his young son Jannie, his engine spluttering with water in the carburettor, free-wheeled his car behind us for the last two miles into the town !

The next day was Christmas Eve, and we left Pietersburg for Pretoria at seven o'clock, and stopped for a picnic breakfast south of Potgietersrust at Moordedrift,¹ near the burial-place of the little children of the Potgieter party murdered there in early days. The spot is shaded by two trees of *Acacia Giraffae*, and during breakfast I tried to imagine the scene. On the way the Hudson car driven by General Smuts' young son had been bogged just south of Pietersburg,

¹ Collected at Moordedrift : No. 2282, *Hibiscus calophyllus* Cav. (MALVACEAE) ; 2283, *Justicia flava* Vahl (ACANTHACEAE) ; 2284, *Lasiocorys capensis* Benth. (LABIATAE).



At Rooikop.

and I give a photograph of the General watching the affair with the philosophic calm so typical of him under the most trying circumstances.

Farther south we paused for a short time to collect on the hill-tops south of the Waterberg, the most striking plants ¹ being *Crossandra Greenstockii* S. Moore (ACANTHACEAE) (No. 2292), a pretty herb 6 in. high, with radical obovate leaves and pedunculate spikes of salmon flowers with spine-toothed imbricate bracts, and *Striga bilabiata* (Thunb.) O. Kuntze (SCROPHULARIACEAE) (No. 2289), a scabrid herb with narrow leaves and spikes of scarlet flowers.

¹ Also collected: No. 2290, *Pentanisia prunelloides* (RUBIACEAE); 2291, *Hypericum aethiopicum* Thunb. (HYPERICACEAE); 2293, *Chironia humilis* Gilg (GENTIANACEAE); 2294, *Pachycarpus Schinzianus* N.E. Br. (ASCLEPIADACEAE).



(Photogs. by the Author.

Afrikaners on General Smuts' Farm at Rooikop.

After morning tea at the comfortable Warmbaths Hotel I was transferred to the Austin car driven by Mr. Gillett, and we reached the Hotel Arcadia, Pretoria, at six o'clock, the General, with characteristic kindness, having gone a long way round to deposit his native "boy" at his own home at Rooikop in the bushveld.

Christmas Day and Boxing Day 1928 were spent at the Pretoria Hotel, and they seemed dull indeed after the strenuous days I had been through since landing in South Africa in the previous August.



Dichrostachys glomerata Chiov. as fuel at Roikop.

Chapter XVII

A SECOND VISIT TO THE ZOUTPANSBERG

FOR convenience I include here an account of a second visit to the Zoutpansberg, which I was enabled to make in August 1930, accompanied by Mr. Jan Gillett (see p. 190), after our expedition to Rhodesia.

The first night on our way northwards from Pretoria we slept out beyond Potgietersrust, in full view of miles of bush fires on the opposite side of the valley. We needed no other illumination, but as we were dropping off to sleep a police officer galloped up and inquired our business.

Next day, on approaching the Zoutpansberg, we turned eastwards before reaching Louis Trichardt, and collected many interesting plants in the grass veld on the foothills of the mountains, arriving at the house of the forestry officer, Mr. Evans, at Klein Australe, in the late afternoon. As we made a large collection in the Zoutpansberg, I have included the plants in a special list, and shall mention only the more interesting that we collected as we passed through the mountains.

The forestry officer's house at Klein Australe is situated on the top of a cone-shaped, forest-clad hill. We botanised in the evening and most of the next day, and made a small collection. Among the more interesting to me were *Micromeria biflora* Benth. (LABIATAE) (No. 4171), growing on bare hillsides, and with the odour of wild thyme, the flowers white; *Mikania scandens* Linn. (COMPOSITAE) (No. 4176), a very widely distributed scandent shrub with ovate-triangular leaves and corymbs of white flower-heads; a scandent *Helichrysum*, *H. panduratum* O. Hoffm., with woolly oblanceolate leaves, and close corymbs of pale yellow flower-heads; a bramble, *Rubus pinnatus* Willd., with orange-red fruits; *Athrixia phyllicoides* DC. (COMPOSITAE) (No. 4183), leaves narrowly oblong, woolly below, rays mauve, disk yellow; *Aeschynomene leptobotrys* Harms (PAPILIONACEAE) (No. 4184), a shrub 10 ft. high., with about ten pairs of oblong leaflets, and few yellow flowers; *Chrysophyllum magalismontanum* Sond. (SAPOTACEAE) (No. 4188), 15 ft. high; *Valeriana capensis* Thunb. (VALERIANACEAE) (No. 4194), a weak herb with pink flowers; *Oldenlandia natalensis* (Hochst.) O. Kuntze (RUBIACEAE) (No. 4199) with narrowly lanceolate leaves and clusters of blue flowers; an apparently new species of *Scilla*, *S. collina* Hutch.¹ with mauve flowers, and *Asparagus medeoloides*

¹ *Scilla collina* Hutch. sp. nov.

Bulbus tunicatus magnus, 5 cm. longus et 3.5 cm. diametro; squamae late rotundatae, circiter 2 cm. longae. Folia pauca, radicalia, obovata, basi angustata, circiter 5 cm. longa et 3 cm. lata. Racemi densiflori, breviter pedunculati, circiter 3 cm. longi; bracteae minutae; pedicelli 5 mm. longi, glabri. Perianthii segmenta subaequalia, pallide caerulea sicco carminea, 5-6 mm. longa, apice cucullata, extra basin versus leviter papilloso-pubescentia. Stamina segmentis paullo breviora; filamenta carminea. Ovarium spongiosum, stipitatum, glabrum; stylus carmineus, staminibus brevior.

Northern Transvaal: Zoutpansberg; Klein Australe, 3400 ft., on bare hillsides, flowers mauve (drying crimson), 19th August, 1930, *Hutchinson & Gillett* 4186 (type in Kew Herbarium).

Thunb. (LILIACEAE) (No. 4190), with ovate-lanceolate cladodes parallel nerved like foliage-leaves.

From Klein Australe we proceeded by a beautifully graded road over the mountains to Entabeni, where we stayed two days with a former Kewite, Mr. R. R. Mentzel, who had been for many years in the Forestry Service of South Africa. The Forest Station stands amidst most picturesque scenery, and the winter climate as experienced by us was delightful.

The Zoutpansberg consists of two or more parallel ranges of hills or



[Photogr. by the Author.]

Dombeya rotundifolia Harv. (STERCULIACEAE), covered with white flowers, between Entabeni and the Pepiti Falls, Zoutpansberg, Northern Transvaal.

low mountains, the southern range being very fertile, with a heavy rainfall, and bearing a forest flora similar in many respects to that of the eastern slopes of the Drakensberg, and even of the Zitzikama and Knysna forests in the extreme south of the Union.

Our collection at Entabeni was a considerable one, and is included in the enumeration farther on, but a few of the more striking plants may be mentioned here. The Podocarp in the forest was *P. latifolius* R.Br. (TAXACEAE) (No. 4283), here a tree about 40 ft. high. RANUNCULACEAE were represented by *Knowltonia transvaalensis* Szyszyl. (No. 4336), with white flowers tinged with red; MELASTOMACEAE by *Dissotis princeps* Triana, about 10 ft. high, with magenta flowers; PAPILIONACEAE by *Psoralea glabra* var. *latifolia* B. Davy (No. 4192), a shrub 12 ft. high, with blue flowers, and *Sphenostylis angustifolia* Benth. (No. 4321), dwarf from a woody rhizome, flowers crimson; HYPERICACEAE by



Shy visitors at our camp in the Zoutpansberg.



Interested and amused at the botanists' activities near the Pepiti Falls, Eastern Zoutpansberg.

Hypericum lanceolatum Lam. (No. 4200), a shrub of 4 ft., with yellow flowers, and the dwarf *H. aethiopicum* var. *glaucescens* Sond. (No. 4238); RHAMNACEAE by *Rhamnus prinoides* L'Hérit. (No. 4215), 10 ft. high, with dull red berries; ARALIACEAE by *Cussonia umbellifera* Sond. (No. 4222) a tree of 35 ft., a stem 11 ft. in girth, and umbels of greyish-green berries; MYRSINACEAE by *Rapanea melanophleas* Mez (No. 4218), with densely arranged red and cream flowers; CORNACEAE by *Curtisia faginea* Ait. (No. 4220), up to 20 ft., leaves opposite, tomentose below. Amongst several *Compositae* was a new climbing species of *Schistostephium*¹ (Nos. 4263, 4265), and the well-known scarlet *Gerbera Jamesonii* Lynch (No. 4317), the "Barborton Daisy," and a less conspicuous species, *G. ambigua* Sch. Bip. (No. 4338), with white flower-heads; two species of *Berkheya*, *B. setifera* (No. 4302), with obovate leaves densely setose above, and *B. subulata* Harv. (No. 4320), with linear leaves bristly on the margins. In stony places grew *Aster Harveyanus* O. Kuntze (No. 4325), with a woody burnt rhizome, and hard ovate-lanceolate sessile several-nerved leaves and pale-blue ray-flowers. By the road cleared through high forest was a climbing *Vernonia* (*Compositae*) with pale mauve flowers, an undescribed species.²

At the edge of the forest was a climbing *Geranium*, *G. ornithopodium* Eckl. & Zeyh. (No. 4289), with white flowers, and a *Salvia* with purple sepals, *S. radula* Benth. (No. 4297). Two Monocotyledons are also worth mention, *Scilla natalensis* Planch. (LILIACEAE) (No. 4258), 1½–2 ft. high, flowers sky-blue, growing among rocks in grassy places, and *Behnia reticulata* Didrichs (No. 4327), belonging to the interesting family PHILESIACEAE (see p. 252), the elliptic-lanceolate leaves with twisted petioles, numerous nerves and transverse secondary nerves, fruits pale yellow and baccate. Among several ferns was the Royal Fern, *Osmunda regalis* Linn. (No. 4330), growing by the stream.

¹ *Schistostephium scandens* Hutch., sp. nov. habitu scandente valde distincta.

Frutex scandens usque ad 5 m. altus; rami breviter pubescentes. Folia breviter petiolata, ambitu late obovata, 4–5 cm. longa, 3–3.5 cm. lata, pinnatifida, segmentis oblongo-oblancoatis lobatis, lobis mucronatis, utrinque parce pubescentia; petioli basi lobis stipulaeformibus instructi. Corymbi terminales, pedunculati; capitula flava, pauca, breviter pedunculata, 6 mm. diametro; pedunculi parce pubescentes. Involucri bracteae circiter 4-seriatae, lanceolatae, pubescentes. Receptaculum ovoideum. Achaenia albedo-marginata.

Transvaal: Zoutpansberg Mts.; below Entabeni, in forest. *Hutchinson & Gillett* 4263; 4265 (type in Kew Herbarium).

² *Vernonia transvaalensis* Hutch. sp. nov.

Scandens; rami sicco costati, leviter pubescentes. Folia lanceolata vel ovato-lanceolata, acute acuminata, basi cuneata, 6–10 cm. longa, 1.5–3 cm. lata, serrata, dentibus cuspidatis, utrinque parce setulosa, infra laxe glandulosa; nervi laterales utrinsecus circiter 6; petioli breves, leviter alati et ciliati. Capitula laxa corymbosa, pallide caerulea; pedunculi ultimi graciles, 2–2.5 cm. longi; bracteae subulatae. Involucri bracteae 3–4-seriatae, exteriores subulatae, acutissimae, ceterae lineari-oblongae, abrupte acuminatae, 6–7 mm. longae, extra tenuiter pubescentes et glandulosae. Achaenia pubescentia, pappo biseriato albedo, setis exterioribus brevioribus.

Transvaal: Zoutpansberg; near Entabeni, 4000 ft., by road cleared through high forest, climber, flowers mauve, 19th August, 1930, *Hutchinson & Gillett* 4225 (type in Kew Herbarium).

The following also belong to this species:—

Woods at Devils Bridge and Moodie's, Barborton, Sept., *Galpin* 549. *Thorncroft* 4359. Near Macamac, *McLea* 3018. Devil's Kantoor, Sept., *Bolus* 7785. Forest at Marovougne, Jan., *Junod* 927. Entabeni, Aug., *B. Davy* 386. Wood-bush, *Galpin* 9388. Eshowe, Zululand, Aug., *Galpin* 13570. *Thode* 1241.

From Entabeni we proceeded towards Palmary Ville, noting on the way numerous scattered examples of *Parinari curatellaefolia* Planch., a tree with a close head 30–40 ft. high and a stem 1–2 ft. in diameter, a characteristic tree in this part of the country. Here and there by the roadside were fine examples in full flower of *Dombeya rotundifolia* Harv., resembling European plum trees, the flowers being precocious and white (see photograph, p. 345).

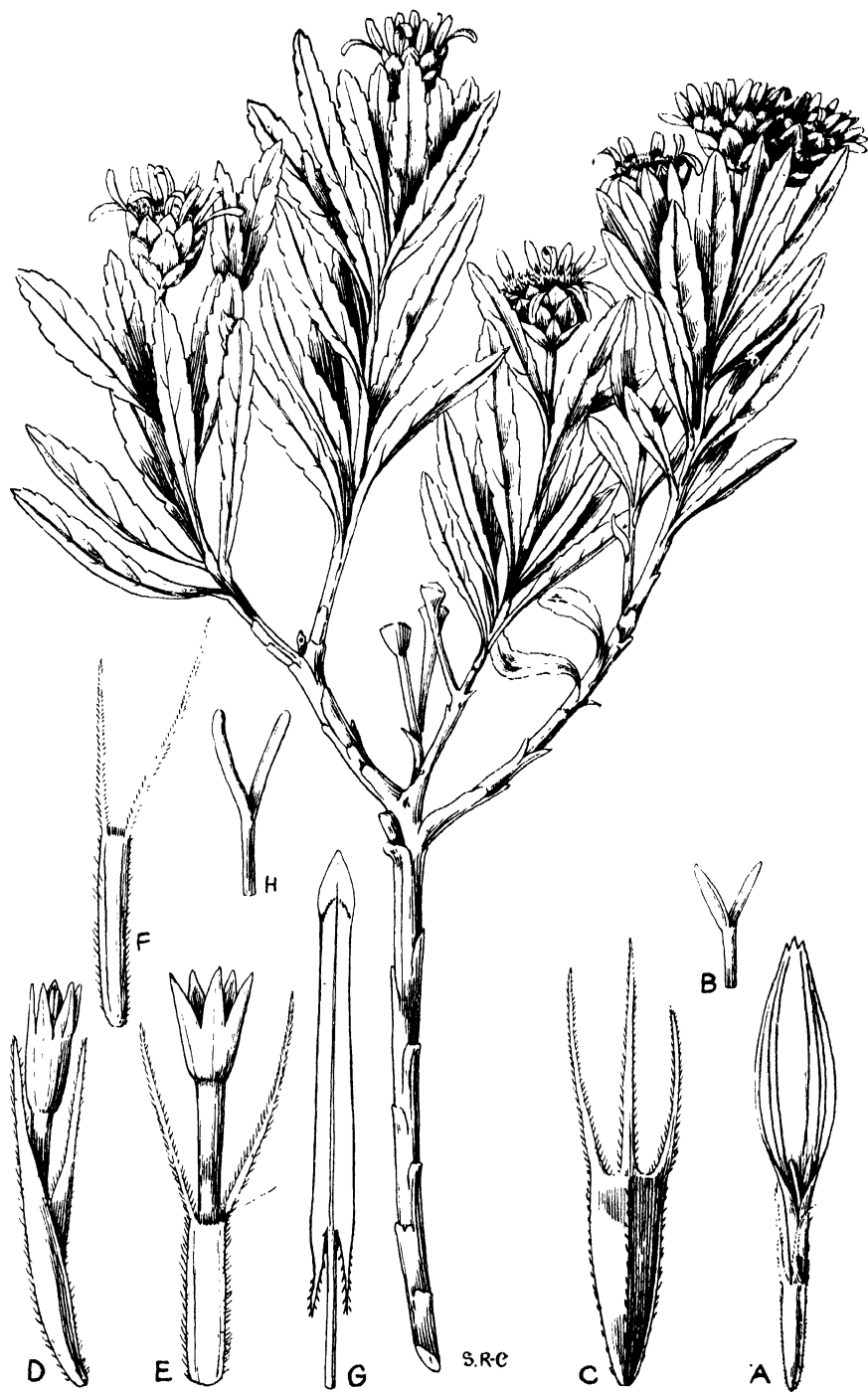
We camped out on the grassy banks of the river near the Pepiti Falls, and had the assistance of several "boys" from the neighbouring village (see photograph). They were keenly interested in our collecting operations. On the grassy flats near the river was a striking species of *Geigeria*, *G. aspera* Harv. (COMPOSITAE) (No. 4341), a leggy shrub 3 ft. high, with linear scabrid gland-dotted leaves and sessile yellow flower-heads. Another Composite was *Helichrysum fulgidum* Willd. (No. 4354), with solitary golden flower-heads. Equally ornamental was *Lasiosiphon canoargentea* C. H. Wright (THYMELAEACEAE) (No. 4345), a small shrub with silky narrow leaves and balls of yellow flowers. Patches of scrub near by were brightened by the scarlet-flowered *Tecomaria capensis* (BIGNONIACEAE) (No. 4350), climbing up to 15 ft.

Near the river was more ligneous vegetation, including *Ochna arborea* Burch. (OCHNACEAE) (No. 4355), a shrub up to 8 ft., with red sepals surrounding the fruits; *Syzygium cordatum* Hochst. (MYRTACEAE) (No. 4343), with sessile cordate leaves and terminal cymes; *Peddiea africana* Harv. (THYMELAEACEAE) (No. 4348), a shrub up to 12 ft., with narrowly elliptic leaves and umbels of flowers, the petaloid calyx-limb green and the tube dull red. Here also was a *Cliffortia*, *C. strobilifera* Linn. (ROSACEAE) (No. 4347), with linear acute leaves, and *Lycopodium cernuum* Linn. (LYCOPODIACEAE). A small fern by the stream was *Asplenium Sandersoni* Hk. (No. 4346), with small cuneate coarsely toothed frond-segments. On the rocks by the Falls was a *Drosera*, *D. trinervia* Spreng. (DROSERACEAE) (No. 4352).

At the edge of the forest a little to the north of the Falls the most striking plants were *Rhynchosia clivorum* S. Moore (PAPILIONACEAE) (No. 4369), an erect shrub up to 10 ft., with yellow flowers and hairy ovate leaflets, and *Brachylaena transvaalensis* Hutch. (COMPOSITAE) (No. 4372), a shrub up to 15 ft., with dentate oblong-ob lanceolate leaves, and dense panicles of white flower-heads.

We were rather reluctant to leave this delectable camping spot, with its plentiful supply of water and pretty scenery. It can be recommended as a suitable headquarters for collecting in this part of the Zoutpansberg.

After returning to Louis Trichardt, we proceeded up the pass, and at the top turned left in a westerly direction; in this part of the mountains we collected some interesting plants, penetrating as far as the road continued to Crewe Farm. About a mile from the main road was the beautiful *Buddleja salviifolia* Linn. (LOGANIACEAE) (No. 4455), with lanceolate closely bullate leaves, and close panicles of pale blue flowers. At 5 miles west a striking plant was *Zuluzianskya Katherinae* Hiern (SCROPHULARIACEAE) (No. 4381), with rhomboid coarsely dentate leaves, and tubular white corollas crimson outside. On this excursion we met with a mixture of the typical Cape flora and that of the Transvaal, including two species of *Protea*, *P. Roupelliae* Meisn. (PROTEACEAE)



Zoutpansbergia caerulea Hutch. a new genus of COMPOSITÆ from the Zoutpansberg.

A, ray flower; B, style arms; C, fertile ray achene; D, disk flower and subtending bract; E, disk flower; F, disk achene; G, stamen; H, style arms.

(No. 4413), a tree up to 20 ft., with hairy narrowly obovate leaves, and pink bracts and flowers—a very beautiful species; the second was the widely spread *P. abyssinica* Willd. (No. 4411), with narrow glabrous leaves and smaller heads of white or pale-pink flowers. About 5 miles west from Louis Trichardt I was rather surprised to find growing wild the strongly scented "Geranium", *Pelargonium graveolens* Ait. (GERANIACEAE) (No. 4384), up to 4 ft., with pink flowers.

At Crewe Farm, which lies 13 miles to the west of Wylie's Poort, we collected among some large boulders *Garcinia Livingstonei* T. Anders. (GUTTIFERAE) (No. 4427), which I had seen on the banks of the Zambesi, but here it was very dwarf. Here also *Diospyros mespiliiformis* Hochst. (SAPOTACEAE) (No. 4426), and *Chrysophyllum magalis-montanum* Sond. (Sapotaceae) (No. 4425), were very small trees. There were also two Rosaceous plants at about the extreme west of their distribution: *Cliffortia natalensis* J.M. Wood (No. 4431), with fascicles of small ericoid leaves, and *Leucosidea sericea* Eckl. & Zeyh. (No. 4389) (see p. 281). A spiny *Euphorbia* up to 8 ft. proved to be *E. caerulea* Harv. (No. 4454), whilst other noteworthy plants were *Lopholaena coriifolia* (Sond.) Phill. & C.A. Smith (No. 4418), a shrub 2½ ft., with spatulate-obovate leaves and close corymbs of small white flower-heads; and *Trichilia pterophylla* C. DC. (MELIACEAE) (No. 4448), a shrub up to 3 ft., with winged petiole, five oblanceolate leaflets, and small two-lobed red fruits.

In a pool were *Limosella maior* Diels (SCROPHULARIACEAE) (No. 4414), with narrow spatulate leaves, and *Scirpus fluitans* Linn. (CYPERACEAE) (No. 4439), with filiform stems and leaves.

Hereabouts we also gathered some ERICACEAE and *Metalasia muricata* R.Br., quite true to type, as it occurs in the sand-dunes of the Cape Flats, whilst a shrubby *Aster* proved to be new, which I described in my preliminary report as *Aster brevipedunculatus* Hutch. (Nos. 4383, 4419). The common Myrtaceous plant here was *Syzygium Legatii* B. Davy & Greenway, a small tree (Nos. 4393, 4398, 4429).

At Crewe Farm we also collected an apparently new genus of COMPOSITAE, belonging to the tribe INULODEAE, and related to *Rosenia*. I have called it *Zoutpansbergia*, with reference to the mountain range; a shrub up to 4 ft., with narrowly oblanceolate toothed leaves and solitary heads with blue-ray flowers, and large paleae on the receptacle. A description is given below,¹ and details of its structure

¹ *Zoutpansbergia* Hutch. genus nov. affinis *Roseniae* Thunb., sed foliis alternis glabris, involuero campanulato, bracteis pauciseriatis, antherarum basibus caudato-ciliatis florum ♀ pappi setis 3 achaenis triangulatis marginibus ciliatis.

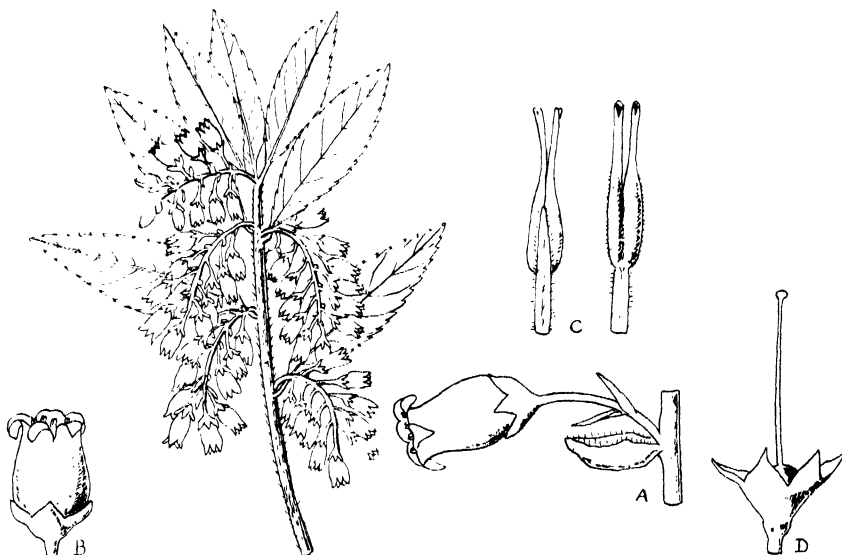
Zoutpansbergia caerulea Hutch. sp. nov. Frutex ramosus, glaber. Folia alterna, petiolata, tenuiter coriacea, serrulata. Capitula ramulis subdense foliatis terminata, solitaria, breviter pedunculata, heterogama, floribus in ambitu ♀ 1-seriatis ligulatis discique ♀ fertilibus. Involucrum campanulatum, bracteis circiter 5-seriatis imbricatis exterioribus gradatim brevioribus conspicue carinatis interioribus anguste membranaceo-marginatis et mox sublaceratis. Flores radii circiter 15, patuli; corollae-tubus 5 mm. longus; lamina anguste oblongo-elliptica, apice tridentata, circiter 1·3 cm. longa et 5 mm. lata, 6-nervia; achaenia triangularia, angulis breviter setulosi; setae 3, rigidae, inaequales, scabridae, 3-4 mm. longae. Flores disci numerosi; corollae tubus 6 mm. longus, lobis 2 mm. longis; antherae basi longe caudatae, caudis ciliatis; styli rami breves, leviter clavati; achaenia complanata, marginibus ciliatis. Receptaculi paleae floribus disci fere aequilongae, plicatae, carina ciliata.

Northern Transvaal: Zoutpansberg; Crewe Farm, West Zoutpansberg,

are shown in the accompanying plate drawn by Miss S. Ross-Craig (see p. 349). Since our discovery of this novelty it has been collected in the Blaauwberg by A. C. Lëeman, in May 1933.

The South African *Vaccinium*

At Crewe Farm we also collected among rocks the only *Vaccinium* known from South Africa, *V. exsul* Bolus, aptly named by the late Dr. Harry Bolus, although it was less of an *exile* than he was aware. It was first described and figured in Hooker's *Icones Plantarum*¹ in 1890, from a specimen collected in September 1886 by Bolus on the Devils Kantur,



Vaccinium exsul Bolus (VACCINIACEAE).

A, flower; B, same; C, anthers; D, calyx and pistil.—After Hook. Ic. Pl.

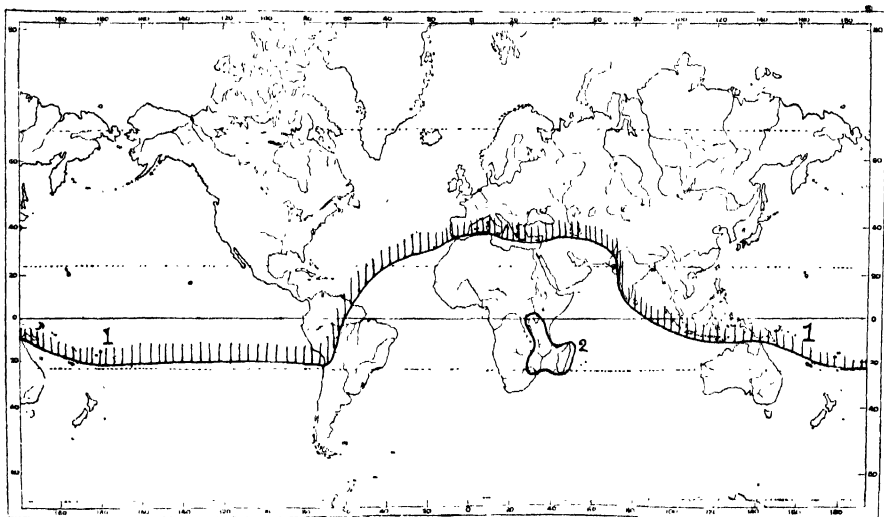
near Barberton, among rocks at about 5500 ft. (Bolus No. 7616). Three years later Galpin also collected the plant at the same spot, among rocks at the edge of a precipice on the summit. It was not again collected, so far as I know, until October 1928, when J. Thode visited the same place, and our discovery of the plant in the western half of the Zoutpansberg is of considerable interest, as the spot where we found it is about 250 miles away in a direct line from the type locality. And a few days later we collected a barren specimen associated with *Widdringtonia* on rocky slopes near Entabeni, in the Eastern Zoutpansberg. There is also in the Kew Herbarium a specimen from Pilgrim's Rest, intermediate and 50 miles north of the type locality, collected by General Smuts in June 1932.

north slopes of the mountains, 5200 ft., shrub up to 4 ft., ray flowers pale blue, 23rd August, 1930, *Hutchinson & Gillett* 4435 (type in Kew Herbarium). Blaauwberg, in river bed, bush 7 ft., 10th May, 1933, *A. C. Leeman* 116 (Nat. Herb. Pretoria, no. 16,559).

¹ Vol. 20 : t. 1941.

The determination of our specimen caused me to look more closely into the status of the Nyasaland species, *V. africanum*, described by Britten ¹ in 1894, and I am convinced that this is not specifically distinct from the Transvaal plant. In describing his supposed novelty, Britten remarked that this was the first species of *Vaccinium* known from Africa, so he was evidently not aware of Bolus' species described four years before. Nor did he know of the existence of *Vaccinium Stanleyi* Schweinf.² described in 1892 from Ruwenzori. The last-mentioned, however, is distinct from *V. exsul*.

There is indeed a slight difference between the Nyasaland plant and that from the Transvaal: in the former the branchlets, however young, are glabrous, in the latter they are softly pubescent. But there seems



1, Approximate southern range of the genus *Vaccinium* (VACCINIACEAE); and 2, range of the genus in Africa and Madagascar, showing complete isolation in these regions from the remainder of the genus.

no other distinction, and I believe them to be the same species, and the presence of a thin indumentum in the one not to be of any specific value.

If this view be correct (it is a matter of opinion either way!), *V. exsul* Bolus (synonym *V. africanum* Britten) is found at high altitudes from the Devils Kantur, near Barberton, at the top of the Drakensberg escarpment, to the Zoutpansberg, and the Tuchila Plateau on Mt. Milanji in Nyasaland, at an altitude of 6000–8000 ft. From my experience of indumentum I feel sure that to rely on it to separate these plants into two species would be putting a false value on a trifling character. And it is not such a far cry from the Zoutpansberg to Mt. Milanje—only about 600 miles. Taking this view, *V. exsul* Bolus, *V. Stanleyi* Schweinf., and a distinct species I have described from the Virunga Mts., *V. Burtii* Hutch., are the only species of *Vaccinium* found on the African continent, but there are at least two species in the

¹ *Trans. Linn. Soc. Ser. 2*, 4: 23 (1894).

² Schweinfurth in *Sitzb. Ges. Naturf. Freunde Berl.* 1892: 173.

island of Madagascar, to one of which, *V. emirnense* Hook. (syn. *V. Forbesii* Hook.), *V. exsul* is closely related. I give a sketch map to show these interesting points in distribution, from which it will be seen that these species are cut off from the remainder of the genus, which is widely spread in the Northern Hemisphere, and for some distance down the Andes of South America.

VACCINIACEAE are somewhat artificially separated from the ERICACEAE in exactly the same way as AMARYLLIDACEAE from the LILIACEAE—i.e., mainly by the inferior and superior ovary respectively—and I hope someone will soon have the time and courage to undertake the study of these two families with a view to recasting them on different lines.

On our return to Wylie's Poort we again went north to the far end of the pass, where we turned eastwards along the north side of the mountains. This region was very dry, and we found little to collect. *Copaifera Mopane* occurred right up to the foot of the range, and there were very numerous examples of the Baobab; indeed, almost a forest of them, which ascended quite high up the northern slopes. We saw, also, large forests of *Androstachys Johnsonii* Prain, with *Acacia* and *Peltophorum africanum* Sond. (see p. 300), the northern slopes of the mountains apparently being the path of migration of the tropical flora from the eastern side.

The road eventually became rather difficult and sometimes troublesome to follow, but at length, when it was nearly dark, we obtained our bearings and recognised country we had previously visited. We camped again for the night, and next day returned to Pretoria.

On the way back we stopped for a short while to investigate the flora of the boulders and rocks at Matoks,¹ a locality mentioned on p. 302. These included *Ficus Burkei* Miq. (MORACEAE) (No. 4460); *F. Soldanella* Warb., No. 4479 (see figure, p. 309); *Pappea capensis* Eckl. & Zeyh. (SAPINDACEAE) (No. 4461), a small shrub with oblong sharply dentate leaves; *Cleome oxyphylla* Burch. (CAPPARIDACEAE) (No. 4462), stems woody, flowers pink, fruits like some Crucifers, the valves hanging from the top of the placentas; a small *Sutera*, *S. debilis* Hutch.² (Scrophulariaceae) (No. 4464), apparently new; *Cyathula cylindrica* Moq. (AMARANTACEAE) (No. 4465), with orbicular-obovate leaves, and globose heads with shining acuminate hooked bracts; *Abutilon pycnodon* Hochr. (MALVACEAE) (No. 4466), a silvery shrub with crenate-dentate very finely stellate-tomentellous

¹ Also collected: No. 4463, *Philyrophyllum Schinzii* O. Hoffm. (COMPOSITAE); 4473, *Rhus Gueinzii* Sond. (ANACARDIACEAE); 4474, *Fluggea virosa* Baill. (EUPHORBIACEAE); 4476, *Cryptolepis transvaalensis* Schltr. (ASCLEPIADACEAE); 4477, *Canthium Gilfilliani* N.E. Br. (RUBIACEAE).

² *Sutera debilis* Hutch. sp. nov., affinis *S. brachiatae* Roth, sed foliis alternis differt.

Herba debilis, caulibus ascendentibus vel decumbentibus puberulis. Folia alterna, late petiolata, ovata vel rhomboideo-ovata, basi cuneata, 5–8 mm. longa, 4–5 mm. lata, 3–4-dentata, utrinque puberula; petioli 2–3 mm. longi. Flores axillares, solitarii, pallide caerulei; pedicelli circiter 5 mm. longi, puberuli. Calyx 4 mm. longus, puberulus; lobi lineari-lanceolati. Corolla 1 cm. longa, supra medium ampliata, lobis ovatis obtusis, extra glabra. Capsula 5 mm. longa, glabra, pedicello 1 cm. longo.

Northern Transvaal: Matoks, amongst granite boulders, flowers pale mauve, 24th August, 1930, *Hutchinson & Gillett* 4464 (type in Kew Herbarium).

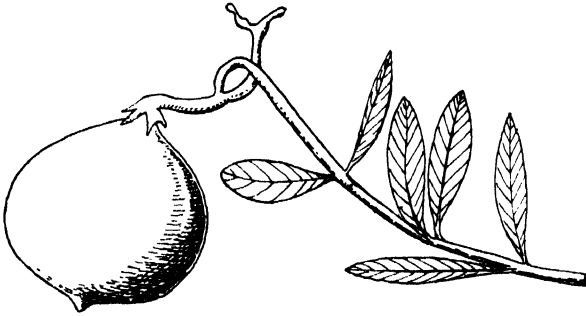
leaves, and small yellow flowers; a form of the common bracken, *Pteridium aquilinum* (L.) Kuhn, var. *lanuginosum* (Hk.), *Hermannia floribunda* Harv. (STERCULIACEAE) (No. 4469), leaves coarsely crenate, loosely stellate, flowers pale yellow, axillary; *Croton pseudopulchellus* Pax (EUPHORBIACEAE), No. 4471 (see figure, p. 318); *Gymnosporia senegalensis* Loesn. (CELASTRACEAE) (No. 4475), a shrub with glaucous broadly oblanceolate denticulate leaves, and small cymes of small white flowers.

Chapter XVIII

BOTANISING AT FOUNTAINS VALLEY (PRETORIA), HARTEBEEST POORT AND IRENE

I NOW resume the story of my first visit in 1928–9, which was interrupted (see p. 344) so as to include some further notes on the Zoutpansberg made in 1930. I broke off the narrative at my return to Pretoria on Christmas Eve, 1928.

During the next few days I was occupied in the National Herbarium at Pretoria labelling my plants and changing the paper in the presses, a labour which can hardly be repeated too often, and must be attended to personally. An afternoon was spent botanising in Fountains Valley¹ with Miss Verdoorn and Mr. Gunn. One of the most interesting plants on the top of the small kopjes was *Landolphia capensis* Oliv. (APOCYNACEAE), one of the four species found in South Africa; this is a small rambling shrublet with small sweet-scented white flowers and edible orange fruits the size of a small apple (see figure below).



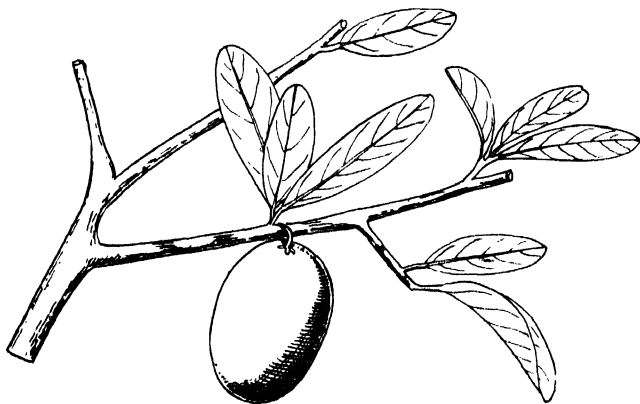
Landolphia capensis Oliv. (APOCYNACEAE), from the Fountains Valley, near Pretoria; fruits orange-yellow.

In the evening I was called to the telephone at the hotel, and was delighted to hear General Smuts' voice asking me to come and stay at his farm. So the next afternoon, after completing my work at the National Herbarium, I packed up my things in the little car, and set off for Doornkloof, Irene, about half-way between Pretoria and Johannesburg, and conveniently near the railway.

Sunday, 30th December, was spent quietly on General Smuts'

¹ Collected at Fountains Valley, 28th December, 1928 : No. 2312, *Landolphia capensis* Oliv. (APOCYNACEAE) (see above); 2313, *Acokanthera venenata* (Thunb.) G. Don (APOCYNACEAE); 2314, *Chrysophyllum magalismontanum* Sond. (SAPOTACEAE); 2315, *Lapeyrousia laxa* (Thunb.) N.E. Br. (IRIDACEAE); 2316, *Sphenostylis angustifolia* Sond. (PAPILIONACEAE); 2317, *Olea verrucosa* Link. (OLEACEAE); 2318, *Sium repandum* Welw. (UMBELLIFERAE); 2319, *Asclepias fruticosa* L. (ASCLEPIADACEAE); 2320, *Astragalus abyssinicus* (Hochst.) A. Rich. (PAPILIONACEAE); 2321, *Celtis Kraussiana* Bernh. (ULMACEAE); 2322, *Pastinaca sativa* Linn. (UMBELLIFERAE); 2323, *Jatropha Zeyheri* var. *subsimplex* Prain (EUPHORBIACEAE); 2324, *Eragrostis nebulosa* Stapf (GRAMINEAE); 2325, *Eulophia Dregeana* Lindl. (ORCHIDACEAE).

farm, and the next day an excursion was made to Hartebeestpoort in the Magaliesberg, the few plants collected being enumerated below.¹ The more interesting were our No. 2337, *Turraea oblancifolia* Bremek. (MELIACEAE), a recently described species, of which I give a sketch (p. 359). No. 2338, *Mundulea sericea* (Willd.) A. Chev. (Papilionaceae), was a plant familiar to me from as far away as West Tropical Africa, a shrub with corky bark, six to ten pairs of lanceolate leaflets appressed-pubescent below; flowers lilac or purplish, in terminal or leaf-opposed racemes; fruits 7–12 cm., tomentose, about 6-8-seeded. This plant is a fish poison, and used in the same way as *Tephrosia Vogelii* Hook. f., but is said to kill and not merely stupify them. Besides being widely spread in Africa, it occurs in Madagascar and India.



Ximenia caffra Sond. (OLACACEAE), fruits vermillion red.

New Year's day 1929 and two or three succeeding days were spent collecting on General Smuts' farm at Doornkloof, and I was not a little surprised at the knowledge of the local flora shown by my kind host, and for once, at any rate, I was content to be silent whilst he named the plants. As we made a considerable collection, it will be more convenient to set them out in systematic order.

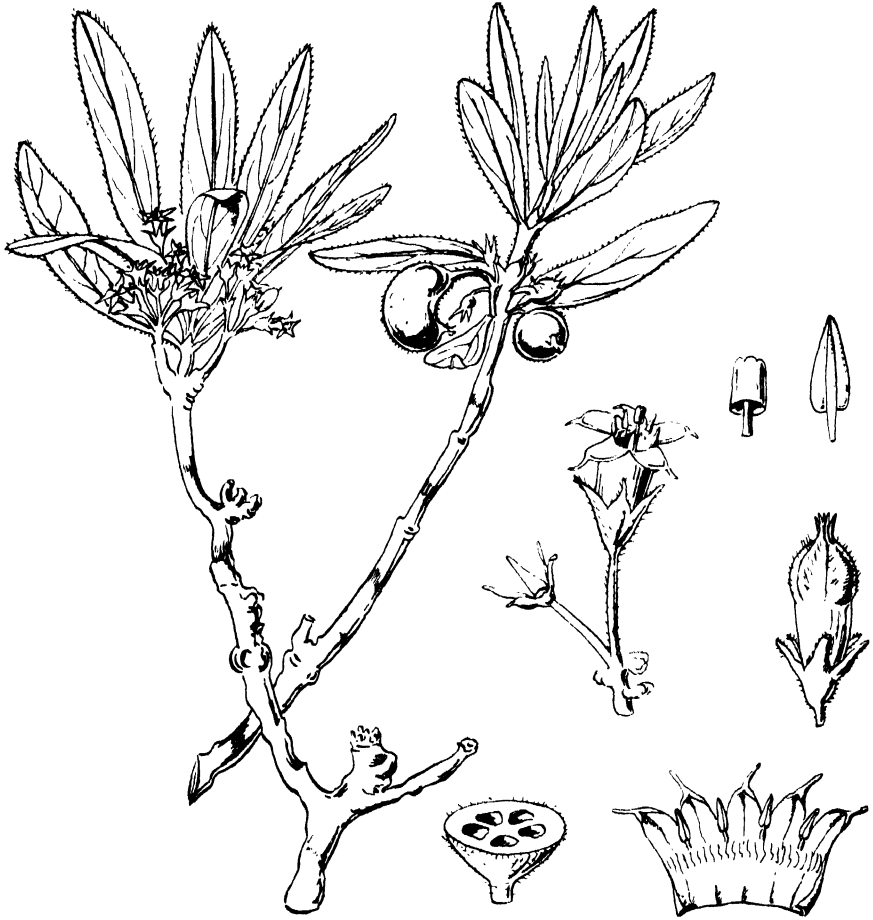
¹ Collected at Hartebeestpoort, Magaliesberg: No. 2326, *Cissus sulcata* C. A. Smith (AMPELIDACEAE); 2327, *Dovyalis Zeyheri* Warb. (FLACOURTIACEAE); 2328, *Acalypha glabrata* Thunb. (EUPHORBIACEAE); 2329, *Olea* sp. (OLEACEAE); 2330, *Cassine Burkeana* (Sond.) Davison (CELASTRACEAE); 2331, *Rhamnus Zeyheri* Sond. (RHAMNACEAE); 2332, *Thesium* sp. (SANTALACEAE); 2333, *Polygala amatymbica* Eckl. & Zeyh.; 2334, *Pachycarpus Schinzianus* N.E. Br. (ASCLEPIADACEAE); 2335, *Tephrosia elongata* E. Mey. var. *pubescens* Harv. (PAPILIONACEAE); 2336, *Duranta repens* Linn. (*D. Plumieri* Jacq.) (VERBENACEAE); 2337, *Turraea oblancifolia* Bremek. (see above); 2338, *Mundulea sericea* (Willd.) A. Chev. (see above); 2339, *Phyllanthus incurvus* Thunb. (EUPHORBIACEAE); 2340, *Tragia rupestris* Sond. (EUPHORBIACEAE); 2341, *Priva Meyeri* Jaub. & Spach. (VERBENACEAE); 2342, *Withania somnifera* Dunal (SOLANACEAE); 2343, *Grewia flava* DC. (TILIACEAE); 2344, *Combretum Kraussii* Hochst. (COMBRETACEAE); 2345, *Combretum Zeyheri* Sond. (COMBRETACEAE); 2346, *Acokanthera venenata* (Thunb.) G. Don; 2347, *Grewia caffra* Meisn. (TILIACEAE); 2348, *Loranthus Zeyheri* Harv. (LORANTHACEAE); 2349, *Chascanum hederaceum* (Sond.) Moldenke (VERBENACEAE); 2350, *Mimusops Zeyheri* Sond. (SAPOTACEAE); 2402, *Ximenia caffra* Sond. (OLACACEAE); 2403, *Acokanthera venenata* (Thunb.) G. Don (APOCYNACEAE).

**Plants Collected at Doornkloof (General Smuts' Farm), Irene,
Transvaal, 1st-2nd January, 1929**

LIGNOSAE (WOODY DICOTYLEDONS)

- PAPILIONACEAE**—*Lotononis foliosa* Bolus (No. 2397): stems short from a woody rhizome; leaves narrowly lanceolate, densely long-villous; flowers capitate, yellow, turning black. *Tephrosia lurida* Sond. (No. 2352): low herb from a woody rhizome; leaves trifoliate, leaflets linear, closely nerved, long-mucronate; racemes few flowered; vexillum reddish, brown outside; wings deep pink. *Indigofera acutisepala* Conrath (Nos. 2383, 2401): shrub 2-3 ft.; branches grey, with adpressed short medifixed hairs; racemes slender, pedunculate; flowers small, purplish red. *I. heterotricha* DC. (No. 2407): slender shrub; branches with long gland-tipped hairs; leaflets about four pairs, glandular; racemes very slender; flowers reddish carmine. *I. oxytropis* Benth. (No. 2400): branches softly tomentellous; leaflets about eight pairs, softly pubescent; flowers in short racemes, pale red, showy. *Zornia tetraphylla* Michx. var. *linearis* Harv. (No. 2392): small herb; leaflets 3-4, linear, dotted with large glands; fruits torulose, with about 5 setose segments.
- ULMACEAE**—*Celtis rhamnifolia* Presl. (not numbered): tree 50 ft. (see photograph); leaves ovate, slightly serrate, thinly pubescent below; fruits small, green.
- THYMELAEACEAE**—*Lasiosiphon Kraussianus* Meisn. (No. 2380, 2386, 2393) (see figure, p. 281).
- TILIACEAE**—*Triumfetta Sonderi* Fic. & Hiern. (No. 2371) (see p. 292)?
- STERCULIACEAE**—*Hermannia betonicifolia* Eckl. & Zeyh. (No. 2390): low herb, branches and leaves below densely stellate-tomentose; leaves broadly ovate, cordate at the base, bullate-reticulate; flowers orange-yellow.
- MALVACEAE**—*Sida chrysantha* Ulbrich (No. 2373): small shrublet, densely covered with short stellate hairs; leaves narrowly oblong, denticulate; flowers yellow, solitary, axillary, on long pedicels.
- MALPIGHIACEAE**—*Triaspis Nelsonii* Oliv. (No. 2360): low shrublet with radiating stems; leaves opposite, sessile, ovate-rounded, clothed with a few medifixed hairs; flowers pink, in leafy oblong panicles; fruits with orbicular wings (see figure, p. 360).
- EUPHORBIACEAE**—*Acalypha senensis* Klotzsch (No. 2375): 2 ft. high, and nettle-like; leaves ovate-lanceolate, cordate at the base, softly villous; male spikes axillary, female terminal, the latter covered with gland-tipped hairs.
- RHAMNACEAE**—*Rhamnus prinoides* L'Hérit. (No. 2391): small tree; leaves narrowly oblong-elliptic, acutely acuminate, finely serrulate; flowers axillary, 1-3-nate, greenish; fruits small, globose. *Helinus integrifolius* (Lam.) O. Kuntze (*H. ovatus* E. Mey.) (No. 2377): climber with axillary watch-spring tendrils; leaves ovate, mucronate; flowers few in axillary cymes.
- ANACARDIACEAE**—*Rhus discolor* E. Mey. (No. 2378): shrub, softly tomentose all over; leaflets 3, narrowly oblanceolate, discolorous; inflorescences shorter than the leaves.
- ASCLEPIADACEAE**—*Cryptolepis oblongifolia* Schltr. (No. 2394): slender shrub, glabrous; leaves lanceolate, acute; flowers axillary, 2-3 together, greenish. *Paehycarpus Schinzianus* N.E. Br. (No. 2366): leaves oblong-lanceolate, with wavy scabrid margins; flowers few or solitary; corolla campanulate, erect, dull white; corona-lobes spatulate, white, with a dark purple band within. *Asclepias affinis* Schltr. (No. 2363): corolla-lobes reddish-brown outside, pale inside; corona-lobes greenish cream. *A. densiflora* N.E. Br. (No. 2364): leaves triangular-ovate, thick and scabrid; flowers in a close pedunculate umbel; corolla reflexed, corona-lobes dull green. *A. fruticosa* Linn. (No. 2367): 3 ft. high; a common and wider spread species. *Cynanchum virens* Dietr. (No. 2372): climber, leaves ovate-triangular, cordate; flowers in axillary clusters. *Schizoglossum glabrescens* Schltr. (No. 2388): tall, slender, and little branched; leaves acicular, glabrous; flowers in axillary clusters, small. *Pentarrhinum inspidum* E. Mey. (No. 2376): climber with ovate-cordate leaves and axillary pedunculate umbels of small flowers.

RUBIACEAE—**Pachystigma Thamnus** *Robyns* (No. 2365): stems dwarf from a woody rootstock; leaves broadly oblanceolate, long-attenuated to the base; flowers in short cymes, pale greenish-white. **Pentanisia prunelloides** (*Sond.*) *Druce* (No. 2357): common herb in grass; leaves linear, glabrous; stipules pectinate; flowers pale mauve. **Oldenlandia stricta** *Linn.* (No. 2387): slender herb from a woody base; leaves linear, scabridulous; flowers pale



The "Gousiektebossie" or "Witappeltjie", *Pachystigma pygmaeum* (Schltr.) Robyns, Transvaal and Natal to Rhodesia, very poisonous to sheep and cattle.

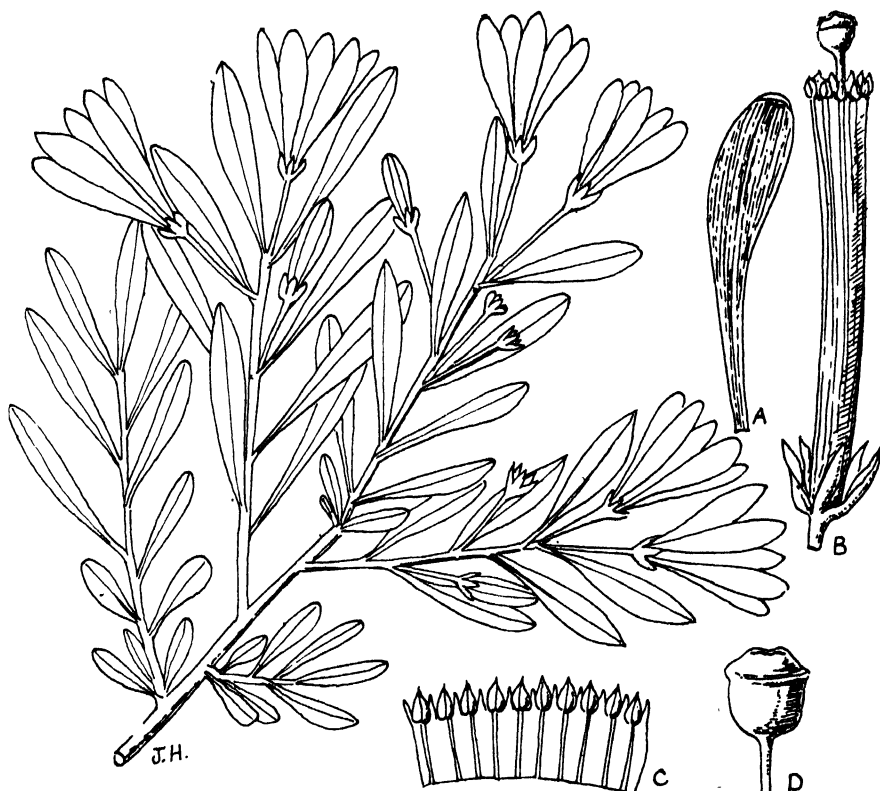
blue, subsessile in the cymes; ovary warted; corolla very slender. **O. amatymbica** *O. Kuntze* (No. 2399): stems slender from a woody stock; leaves few (2-3 whorls), narrowly linear, glabrous; flower-clusters umbellate, corolla pale blue, slender; ovary smooth. **Anthospermum rigidum** *Eckl. & Zeyh.* (No. 2379): stems numerous and unbranched from a woody rootstock; leaves short, ericoid; flowers axillary, sessile; fruits obovoid, scabrid.

HERBACEAE (HERBACEOUS DICOTYLEDONS)

CARYOPHYLLACEAE—**Dianthus micropetalus** *Ser.* (No. 2395, 2408): herb 1 ft. high; leaves short and rigid, very acute; calyx 1.5 cm. long; petals white.

MOLLUGINACEAE—*Psammotropha myriantha* Sond. (No. 2396): densely tufted with numerous radical linear-acicular leaves; flowers small, pale, in whorls. *Pollichia campestris* Soland. (No. 2361): dwarf erect much-branched shrublet, with whorled leaves and sessile clusters of small flowers and small white edible berries.

COMPOSITAE—*Aster Harveyanus* O. Kuntze (No. 2382): herb 1½ ft.; leaves linear-lanceolate, scabrid on the margin; heads solitary on slender peduncles, rays blue. *A. muricatus* Less. (No. 2385): stems short and slender, numerous from a woody stock; leaves acicular; heads small, with small mauve rays. *Nidorella hottentotica* DC. (No. 2353): white woolly all over; leaves



Turraea oblancifolia Bremek. (MELIACEAE).

A, petal; B, calyx, stamens and stigma; C, upper part of staminal column from inside; D, stigma.

spathulate-oblongate; heads small, pale lemon yellow. *Conyza podoccephala* DC. (No. 2374): leaves oblanceolate, irregularly toothed, setulose-scabrid; heads on long peduncles, yellow. *Helichrysum acutatum* DC. (No. 2355): woolly stems and lanceolate acute leaves; heads densely corymbose, bright lemon yellow. *H. lanatum* Harv. (No. 2356): densely felted; lower leaves obovate, upper lanceolate, acute; bracts lemon, flowers orange-yellow. *Senecio mollicomis* C.A. Sm. (No. 2354): slender herb; leaves linear, serrulate and closely verrucose, subauriculate at the base; flower-heads few, subcorymbose, rays yellow. *Osteospermum muricatum* E. Mey. (No. 2362): leaves narrow, pinnately lobulate-toothed; flowers pale yellow; achenes obovoid, muricate on the outside. *Dimorphotheca spectabilis* Schltr. (No. 2370): sparingly branched herb; leaves sessile, lanceolate, scabrid on the margin; heads solitary, pedunculate; peduncle and bracts scabrid-puberulous; disk and rays deep mauve. *Vernonia*

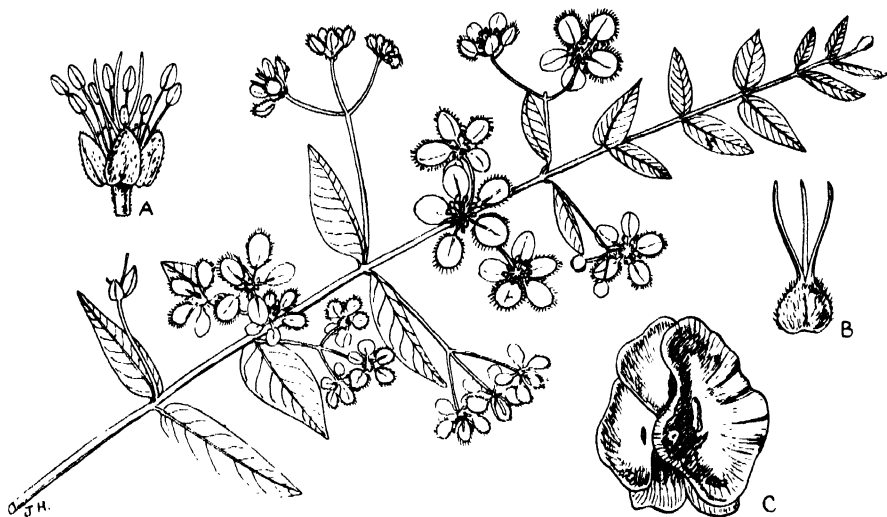
monocephala *Harv.* (No. 2368): stems simple, scabrid; leaves sessile, lanceolate, glandular-punctate and scabrid, acute; heads long-pedunculate, flowers deep mauve.

SCROPHULARIACEAE—**Graderia subintegra** *Mast.* (No. 2389): low much-branched herb, woody at the base; leaves subalternate, lanceolate, scabrous on the margin and midrib; flowers subsessile, mauve. **Striga bilabiata** (*Thunb.*) *O. Ktze.* (**S. Thunbergii** *Moq.*) (No. 2381): erect herb with simple stems 6–9 ins.; leaves shortly setulose, narrow; bracts leaf-like; mauve flowers in close spikes, bilabiate.

DIPSACACEAE—**Scablosa Columbaria** *Linn.* (No. 2398): leaves pinnately divided; flower-heads pale mauve or white.

SELAGINACEAE—**Walafrida paniculata** *Rolfe* (No. 2404): diffuse and prostrate from a woody stock; leaves linear, glabrous; flowers in terminal clusters, very small, white.

ACANTHACEAE—**Justicia anagalloides** *T. And.* (No. 2384): stems short and simple; leaves oblanceolate, glabrous; flowers mauve, in short axillary racemes.



Triaspis Nelsonii Oliv. (MALPIGHIACEAE), at Doornkloof, Irene, Transvaal.

A, flower; B, pistil; C, fruit.

MONOCOTYLEDONS

LILIACEAE—**Anthericum pulchellum** *Baker* (No. 2406): slender herb; leaves elongate-linear, much overtopped by the slender inflorescence 2–2½ ft. high; flowers white, nerved with green.

ORCHIDACEAE—**Eulophia Dregeana** *Lindl.* (No. 2369): about 1 ft. high; leaves spreading fan-wise, curved; cauline leaves bract-like, overlapping; flowers pale creamy white.

GRAMINEAE—**Cymbopogon plurinodis** *Stapf* (No. 2405): a tufted perennial up to 3 ft., with glaucous leaves scabrous on the margin and lax narrow panicles. **Rhyncholetrum setifolium** (*Stapf*) *Chiov.* (No. 2351): culms 1–1½ ft. high, with filiform glabrous or hairy leaves; nodes densely woolly; spikelets densely villous, with shining white or pink hairs; **R. repens** (No. 2351a): like the last, but leaves broader and shorter. **Eragrostis chloromelas** *Steud.* (No. 2358): a densely tufted perennial, 1½ ft., with filiform glaucous leaves and open panicles; spikelets about 5 mm. long, pale grey. **Themeda triandra** *Forssk.* var. **hispida** *Stapf* (No. 2359): tufted, leaves glaucous or reddish; spikelets long-pilose.

Chapter XIX

TRIP TO THE NORTH-EASTERN TRANSVAAL

ON 4th January I went, by train with Dr. Pole Evans from Pretoria to Louw's Creek, the lorry caravan having been railed to that station. We arrived at Louw's Creek at 10.30 next morning, and after unloading the lorry proceeded towards the Maid of the Mist Mountain,¹ which Dr. Pole Evans was anxious to explore.

The first part of the road led up a steep ascent through dense, low forest, and then over grassy mountains. Our difficulties may be imagined by the fact that it took us six hours to accomplish thirteen miles, and, instead of botanising, all hands were needed to help propel the lorry up the steepest ascents, sometimes only a few feet at a time, big stones often having to be placed under the wheels to stop it running downhill. It was hot work in this climate, and a camp bed was a welcome resting-place that evening.

At the beginning of the day one of the most striking plants observed was *Sutera grandiflora* Hiern (No. 2412), which is now to be seen in cultivation in Great Britain (see *Botanical Magazine*, t. 9452). It grew among grass and bushes on the ascent from the low country, about 3 ft. high, with light blue flowers, large for the genus. Also among the bushes was a familiar greenhouse plant, *Gloriosa virescens* Lindl. (LILIACEAE) (No. 2416), with bright yellow flowers and non-crinkled perianth-segments. A pretty *Helichrysum*, *H. longifolium* DC. (syn. *H. mixtum* O. Hoffm.) (No. 2417), grew on the hill-tops, with narrow woolly stem-leaves, and a dense cluster of heads with pale greenish-yellow bracts. The most exciting species to me, however, was *Protea RoupPELLIAE* Meisn. (No. 2429), which grew here and there, scattered on the hillsides; a small tree up to 15 ft. high, with oblanceolate woolly leaves and rather large heads, with the bracts pale red within and silky-grey outside. Another low shrublet which was conspicuous was *Lotononis tenuipes* B. Davy (PAPILIONACEAE) (No. 2432), with oblanceolate leaflets and terminal clusters of pale-yellow flowers. Striking plants

¹ Also collected between Louws Creek and Maid of the Mist Mountain: No. 2410, *Trema guineensis* (Schum.) Ficalho (ULMACEAE); 2411, *Dyschoriste Rogersii* S. Moore (ACANTHACEAE); 2413, *Berkheya setifera* DC. (COMPOSITAE); 2414, *Senecio caudatus* DC. (COMPOSITAE); 2415, *Nidorella senecionidea* DC. (COMPOSITAE); 2418, *Cluytia virgata* Pax (EUPHORBIACEAE); 2419, *Selago Wilmsii* Rolfe (SELAGINACEAE); 2420, *Lasiosiphon splendens* Endl. (THYMELAEACEAE); 2421, *Stachys nigricans* Benth. (LABIATAE); 2422, *Lasiosiphon caffer* Meisn. (THYMELAEACEAE); 2423, *Inezia integrifolia* (Klatt) E. P. Phillips (COMPOSITAE); 2424, *Cyperus compactus* var. *flavissimus* (CYPERACEAE); 2425, *Pearsonia aristata* (Schinz) Dummer (PAPILIONACEAE); 2426, *Clerodendrum triphyllum* Harv. (VERBENACEAE); 2427, *Buchnera dura* Benth. (SCROPHULARIACEAE); 2428, *Psychotria capensis* Vatke (RUBIACEAE); 2430, *Combretum Kraussii* Hochst. (COMBRETACEAE); 2431, *Endostemon obtusifolius* N.E. Br. (LABIATAE); 2434, *Olea capensis* Linn. (OLEACEAE); 2435, *Cluytia monticola* S. Moore (EUPHORBIACEAE); 2436, *Vernonia oligocephala* (DC.) Sch. Bip. ex Walp.; 2437, *Justicia trinervis* Vahl (ACANTHACEAE); 2438, *Gymnosporia buxifolia* Szysz. (CELASTRACEAE); 2447, *Chascanum latifolium* var. *glabrescens* (H. H. W. Pears.) Moldenke (VERBENACEAE); 2448, *Acacia Davyi* N.E. Br. (MIMOSACEAE), No. 2448.



[Photogr. : I. B. Pole Evans, Feb. 1930.]

The Botanical Survey caravans crossing a South African river.



[Photogr. : I. B. Pole Evans, Apr. 1934.]

Protea Roupelliae Meisn. (PROTEACEAE), on hill slopes at Dullstroom, North-Eastern Transvaal.

standing up like sentinels among the grass were *Rhynchosia Woodii* Schinz. (PAPILIONACEAE) (No. 2433), only a few plants being seen, up to 4½ ft. high, with subsessile trifoliolate grey silky leaves and short axillary inflorescences of greenish-yellow flowers.

We camped out on the top of a hill near a small clump of bush (see photograph, p. 366) composed of the following species growing in association :—

Acacia caffra Willd. (MIMOSACEAE) (No. 2439), a tree 20 ft. high with numerous small leaflets and spikes of cream-white flowers; internodes with small prickles; *Rhoicissus erythroides* (Fres.) Pl. (No. 2440), climber with obovate-wedge-shaped leaflets pubescent below and coarsely dentate; *Rubus rigidus* Sm. (ROSACEAE) (No. 2441), a “black-berry”, a small shrub with the leaflets softly white-tomentellous below, and short panicles of flowers with pink petals; *Grewia occidentalis* Linn. (TILIACEAE) (No. 2442), a small tree, with ovate-lanceolate acuminate nearly glabrous leaves; *Allophyllus transvaalensis* B. Davy (SAPINDACEAE) (No. 2443), a tree, 15 ft.; leaves trifoliolate, leaflets elliptic, serrulate, hairy in the axils of the nerves below, and axillary panicles of very small greenish yellow flowers; *Trimeria grandifolia* (Hochst.) Warb. (FLACOURTIACEAE), a small tree with suborbicular dentate leaves 5-nerved from the base, and with spreading hairs at the base of the nerves, and catkin-like inflorescences of very small flowers; *Hibiscus pedunculatus* Linn. f. (MALVACEAE) (No. 2445), a small shrub, with 3-lobed leaves thinly stellate-pubescent below, and mauve flowers on long axillary pedicels; *Oldenlandia natalensis* Hochst. (RUBIACEAE) (No. 2446) a herb about 1 ft., with lanceolate acute leaves and terminal clusters of slender white or pale blue flowers.

The Maid of the Mist Mountain¹ did not prove after all to be a very rich collecting ground, and we made only a few additions to our presses. Plants of note were *Gerbera Kraussii* Sch. Bip. (COMPOSITAE) (No. 2455), with a few radical elliptic denticulate leaves setulose above and white-woolly below, ray-flowers white above, red below; *Polygala Galpinii* Hook. f. (POLYGALACEAE) (No. 2461), a shrub growing in dense shade, with ovate-lanceolate acute leaves, and slender racemes of pink flowers. A striking little *Ipomoea* well worth growing in a pot was *I. simplex* Thunb. (CONVOLVULACEAE) (No. 2464), with a tuberous root-stock, linear lanceolate leaves forming a rosette for the two or three white flowers about 3·4–5 cm. long.

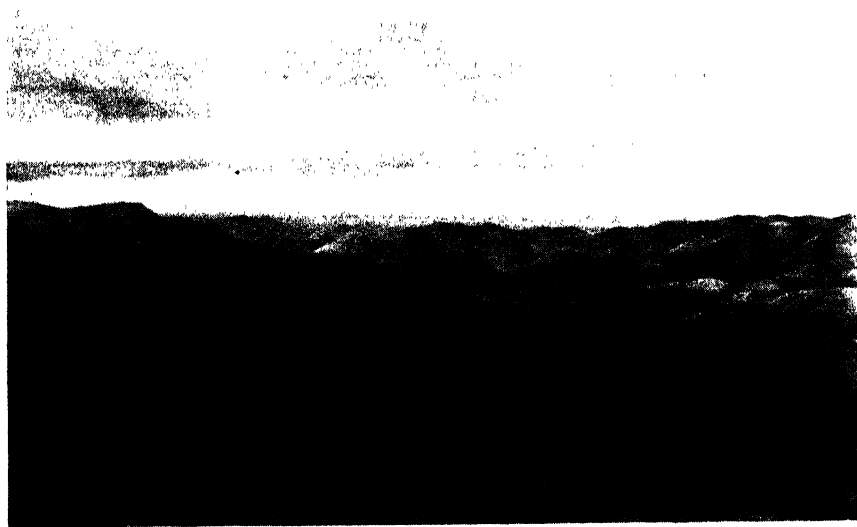
It was delightful country between the Maid of the Mist Mountain and the Hora forest, but the threat of bad weather made us hasten from the latter place, for after storms the roads are impassable and the streams become flooded. We returned to Louw's

¹ Also collected: No. 2449, *Clerodendrum glabrum* E. Mey. (VERBENACEAE); 2450, *Ruellia patula* Jacq. (ACANTHACEAE); 2451, *Pavetta barbertonensis* Bremek. (RUBIACEAE); 2452, *Royena Galpinii* Hieron. (EBENACEAE); 2453, *Pearsonia aristata* (Schinz) Dümmer (PAPILIONACEAE); 2454, *Selago Junodii* Rolfe (SELAGINACEAE); 2456, *Disa stachyoides* Rehb. f. (ORCHIDACEAE); 2457, *Phyllanthus heterophyllus* Müll. Arg. (EUPHORBIACEAE); 2458, *Disa patula* Sond. var. *transvaalensis* Summerh. (ORCHIDACEAE); 2459, *Barleria ovata* E. Mey. (ACANTHACEAE); 2460, *Senecio pellucidus* DC. (COMPOSITAE); 2462, *Richardsonia scabra* St. Hil. (RUBIACEAE); 2463, *Anthospermum pumilum* Sond. (RUBIACEAE); 2465, *Satyrium longicauda* Lindl. (ORCHIDACEAE); 2466, *Vigna triloba* Walp. (PAPILIONACEAE); 2467, *Cephalanthus natalensis* Oliv. (RUBIACEAE); 2468, *Vellozia viscosa* Baker (HYPOXIDACEAE).



[Photogr. : I. B. Pole Evans, Jan. 1929.]

The Three Sisters Gold Mine, Barberton District.



[Photogr. : I. B. Pole Evans, Jan. 1929.]

Mountain country near Barberton, from Three Sisters, Transvaal.

Creek¹ and loaded up our surplus gear, and thence proceeded to Barberton.

At eight miles by the road from Louw's Creek² we found an orchid, *Eulophia Wakefieldii* (Rehb. f. & S. Moore) Summerh. (No. 2470), which is widely spread in East Africa.

My eye was taken particularly by a dwarf *Acacia*, *A. swazica* Burt Davy (MIMOSACEAE) (No. 2471), low bushes 3-4 ft. high, with about four pairs of elliptic leaflets to each pinna and setosely tipped, small yellow balls of flowers, and sickle-shaped fruits about 5 cm. long and sticky with sessile glands. Here and there *Bauhinia Galpinii* N.E. Br. (CAESALPINIACEAE) (No. 2472), made a brave show (see p. 332), and our No. 2473 proved to be an interesting plant, the *Triaspis Nelsonii* var. *glabra* of Burt Davy's Flora (MALPIGHIACEAE). After seeing this in the bush, and studying the herbarium material, I am convinced it is a distinct species, and I find it was named *T. Thorncroftii* by Spencer Moore (Journ. Bot. 1921: 248). It was first collected by Galpin (No. 643) in the Queen's River Valley, Barberton, in 1889, and later by Thorncroft (Herb. Rogers 28,566) near Barberton. *T. Nelsonii* grows around Pretoria at a much higher elevation than *T. Thorncroftii*, and is figured in the *Flowering Plants of South Africa*, t. 109. I also collected it on General Smuts' farm near Irene (see p. 360).

At 10 miles from Barberton³ a tall Liliaceous plant was very conspicuous among the trees. This was *Ornithogalum Saundersiae* Baker (No. 2477), with greenish-white flowers; its nearest ally is *O. arabicum* Linn., from the Mediterranean region.

At 12 miles⁴ and 23 miles⁵ we also gathered a few specimens, none of which needs special mention.

Near Impala Siding we again met with *Sterculia Rogersii* N.E. Br. (STERCULIACEAE) (No. 2490), which we had collected earlier at the Limpopo (see p. 317); *Heeria mucronata* Bernh. ex Krauss (ANACARDIACEAE) (No. 2491), a shrub with simple oblong-lanceolate leaves very glaucous below, and close panicles of small white flowers; *Hibiscus atromarginatus* Eckl. & Zeyh. (MALVACEAE) (No. 2492), the flowers being either yellow (!) or deep crimson (!) with a purple blotch in each case. *Turraea oblancifolia* Bremek. (MELIACEAE) (No. 2493) (see figure, p. 359); *Diospyros mespiliformis* Hochst. (EBENACEAE), (No. 2494); *Grewia flavescens* Juss. (TILIACEAE) (No. 2495), leaves oblong-elliptic, serrulate, flowers yellow, in threes.

¹ Collected near Louw's Creek: No. 2469, *Fluggea virosa* Baill. (EUPHORBIACEAE), berries white.

² Also collected at 8 miles from Louw's Creek: No. 2474, *Rhus Rogersii* Schönl. (ANACARDIACEAE); 2475, *Lasiosiphon capitatus* (L. f.) B. Davy (THYMELAEACEAE); 2476, *Crotalaria australis* Bak. f. (PAPILIONACEAE).

³ Also collected at 10 miles: 2478, *Seddera suffruticosa* (SCHINZ) Hall. f. (CONVOLVULACEAE).

⁴ Collected at 12 miles: No. 2479, *Cassia Absus* Linn. (CAESALPINIACEAE); 2480, *Pachystigma venosum* Hochst. (RUBIACEAE); 2481, *Thesium gracilarioides* A. W. Hill (SANTALACEAE).

⁵ At 23 miles: 2482, *Adenia senensis* (Klotzsch) Engl. (PASSIFLORACEAE); 2483, *Jatropha variifolia* Pax. (EUPHORBIACEAE); 2484, *Euphorbia transvaalensis* Schltr. (EUPHORBIACEAE); 2485, *Dalbergia armata* E. Mey. (PAPILIONACEAE); 2486, *Rauwolfia caffra* Sond. (APOCYNACEAE); 2487, *Steganotaenia araliacea* Hochst. (UMBELLIFERAE); 2488, *Ruttya ovata* Harv. (ACANTHACEAE); 2489, *Commiphora Harveyi* Engl. (BURSERACEAE).

Near Tonetti we encountered an *Aloe*, *A. affinis* Berger (LILIACEAE) (No. 2496), with salmon-pink flowers.

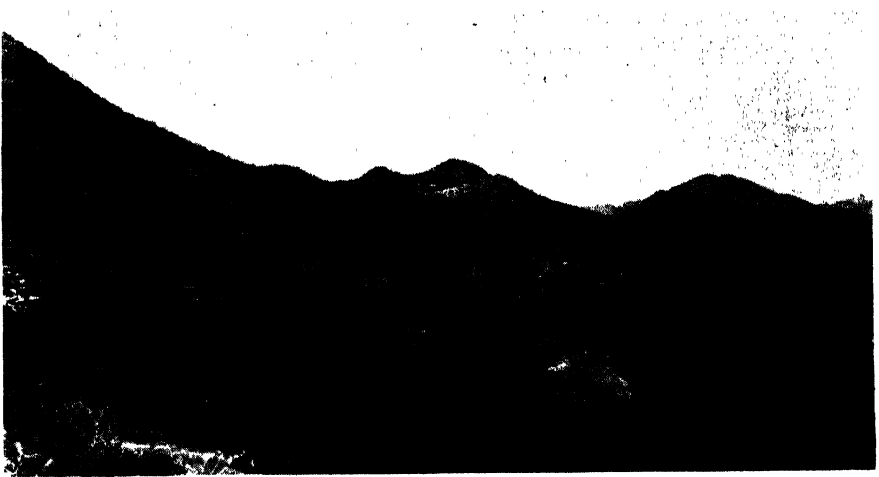
At Barberton on 7th January I was very interested to meet Mr. George Thorncroft, a veteran botanical collector, after whom many plants have been named. His friend Mr. Andrews was anxious to test a new car up the mountain road, so we travelled with him. For about 6 miles we had a glorious climb towards the Lomati Falls. Towards the top we stopped to collect,¹ among the more showy plants being *Dimorphotheca spectabilis* Schltr. (COMPOSITAE) (No. 2497), a herb about 1½ ft. high, with lanceolate leaves, and handsome heads of deep crimson flowers. A pretty *Chrysanthemum*, *C. osmitoides* Harv. (No. 2501), grew here and there, a rare species, with a woolly base, simple stems,



Our camp in the hills near the Maid of the Mist mountain, in the Barberton District; the chief constituent of the clump of bush was *Acacia caffra* Willd. (MIMOSACEAE).

sessile narrowly lanceolate sharply toothed leaves and white ray-flowers, very like the British "Dog-daisy"; and a pleasing species of *Orthosiphon*, *O. serratum* Schltr. (LABIATAE) (No. 2502), about a foot high, with narrowly obovate, coarsely toothed leaves and crimson or mauve flowers, one of the calyx-lobes large and crimson. A dwarf *Hibiscus*, *H. atromarginatus* Eckl. & Zeyh. (MALVACEAE) (No. 2504), was dotted here and there in the grass, with deeply trilobed coarsely-toothed leaves and fairly large flowers, yellow with a purple blotch, whilst I was reminded of my work on the Cape EUPHORBIACEAE by *Dalechampia Galpinii* Pax (No. 2506), a dwarf creeper with palmately 3-5-partite leaves and large lobulate yellow bracts.

¹ Also collected towards Lomati Falls: No. 2498, *Barleria ovata* E. Mey. (ACANTHACEAE); 2499, *Helichrysum calocephalum* Klatt (COMPOSITAE); 2500, *Pachycarpus Schinzianus* N.E. Br. (ASCLEPIADACEAE); 2503, *Chascanum adenostachyum* (Shau.) Moldenke (SCROPHULARIACEAE); 2505, *Anthericum Galpinii* Bak. (LILIACEAE); 2507, *Anthericum polyphyllum* Baker (LILIACEAE); 2508, *Raphionacme procumbens* Schltr. (ASCLEPIADACEAE).



[Photogr. : I. B. Pole Evans, Jan. 1929.]

Bush Veld country between Barberton and Louw's Creek; the trees are *Pterocarpus angolensis* DC. (PAPILIONACEAE), *Sclerocarya caffra* Sond. (ANACARDIACEAE), *Peltophorum africanum* Sond. (CAESALPINIACEAE), *Lannea discolor* Engl. (ANACARDIACEAE), *Combretum* spp. (COMBRETACEAE), and *Acacia* spp. (MIMOSACEAE).



[Photogr. : I. B. Pole Evans, Jan. 1929.]

Acacia litakunensis Burch. (MIMOSACEAE), between Barberton and Louw's Creek.



[Photogr. : I. B. Pole Evans, Jan. 1929.

The Author's camp bed, with mosquito net suspended from a small tree, and plant presses, near Melalane, North-Eastern Transvaal.



[Photogr. : I. B. Pole Evans, Jan. 1929.

The Author sitting on his specimens near Louw's Creek, North-Eastern Transvaal.



Refreshments under a big tree of *Ficus Sycomorus* Linn. (the Author standing).



Native woman in the North-Eastern Transvaal.

From Barberton (where a longer stay would have been an advantage) we travelled to Melalane, through mile after mile of *Acacia*, the dwarf *A. swazica* Burt Davy (see p. 365) (No. 2471) being very common. There were numerous fine trees of *Sclerocarya caffra* Sond. (ANACARDIACEAE), *Peltophorum africanum* Sond. (CAESALPINIACEAE), *Pterocarpus sericeus* Benth. and *P. angolensis* DC. (PAPILIONACEAE), *Combretum* spp., and a few examples of *Terminalia sericea* Burch., and *Acacia litakunensis* Burch. (MIMOSACEAE), with sometimes a stray example of *Kigelia pinnata* DC. (BIGNONIACEAE), the sausage or cucumber tree, and rarely a few bushes of *Bauhinia Galpinii* N.E. Br. (CAESALPINIACEAE). There were also a few large examples of *Ficus*



[Photogr. : I. B. Pole Evans, Jan. 1920.]

On the left, *Syzygium guineense* DC. (MYRTACEAE), between Hectorspruit and Piggs Peak Mine.

gnaphalocarpa Miq. (MORACEAE), very many *Acacia nigrescens* Bolle (MIMOSACEAE), the "Knoppiesdoorn", often subdominant. Farther eastwards *Combretum* became more plentiful, but the grass was very much dried up and there was little herbaceous vegetation. A striking flat-topped tree by the roadside was *Acacia litakunensis* Burch. (see photograph, p. 367).

At Louw's Creek ¹ we visited the police-station, around which was a hedge of a Euphorbiaceous plant which puzzled me greatly, as I could recall nothing like it in the *Flora Capensis*. This proved to be an exotic from Mexico, *Pedilanthus tithymaloides* Poit. (No. 2509), with a zygomorphic involucre pouched at the base, and with white anthers. Nearby was growing a striking climber, *Senecio garcizans* Schltr.

¹ Also collected here : No. 2511, *Stomatostemma Monteiroae* (Oliv.) N.E. Br. (ASCLEPIADACEAE); 2512, *Jatropha variifolia* Pax (EUPHORBIACEAE); 2513, *Erythrina lysistemon* Hutch. (PAPILIONACEAE); 2514, *Corbichonia decumbens* (Forssk.) Exell (FICOIDACEAE); 2515, *Raphionacme procumbens* Schltr. (ASCLEPIADACEAE).

(COMPOSITAE) (No. 2510), with fleshy, very brittle stems, small obovate leaves and small corymbs of narrow rayless heads of white flowers.

We slept out in the bush at Melalane, where I erected my camp-bed beneath a small *Acacia* tree, from which I suspended the mosquito-net (see photograph, p. 368). About 4.30 a.m. I heard a lion roar, but fortunately some distance away towards the Kruger National Park, an oblong area of about 8000 square miles, about 240 miles from north to south, and from 20 to 40 miles wide. On the north it is bounded by the Pafuri River, a tributary of the Limpopo arising in the eastern Zoutpansberg, and on the south by the Crocodile River, which is closely followed by the railway from Nelspruit to Komati Poort.



[Photogr. : I. B. Pole Evans, Jan. 1929.]

Country between Hectorspruit and Peggs Peak Mine; Horo forest on the mountains in the distance.

The flora of the National Park is still very imperfectly known, but a preliminary list ¹ of the species already collected has been published by Miss A. A. Obermeijer.

After calling at Hector's Spruit, we proceeded towards the Hora forest through very beautiful country with much *Terminalia sericea* Burch. (COMBRETACEAE), and other fine trees characteristic of the Low Veld. The vegetation was much more tropical in character, the more striking plants met with at 11 miles ² being *Bauhinia Kirkii* Oliv. (CAESALPINIACEAE) (No. 2519), with pilose orbicular leaves deeply cordate at the base, and rather small pale yellow flowers, at 23 miles, ³ *Combretum Millerianum* Burt Davy (COMBRETACEAE) (No. 2522), a

¹ Obermeijer, *Annals Transvaal Museum*, 17 : 185-227 (1937).

² Also collected at 11 miles from Hector's Spruit : No. 2517, *Anthericum patulum* Baker (LILIACEAE); 2518, *Coccinea Rehmannii* Cogn. (CUCURBITACEAE); 2520, *Ruellia patula* Jacq. (ACANTHACEAE).

³ Also collected at 23 miles : No. 2521, *Hoslundia opposita* Vahl (LABIATAE).

tree 45 ft. high, with narrowly elliptic leaves densely lepidote below with pale scales, and elliptic scurfy fruits. In fine grass country between 26 and 31 miles, where we were compelled to return as hard as we could go because of an approaching thunderstorm, we collected a small number of interesting species¹ including *Duranta repens* Linn. (D. Plumieri Jacq.) (VERBENACEAE) (No. 2523), an introduced plant from Tropical America, here a shrub 6 ft. high, with blue flowers. A "Dog-daisy"-like Composite was *Callilepis Laureola* DC. (No. 2524), with sessile lanceolate leaves and white rays; the recently described



[Photogr. : I. B. Pole Evans, Jan. 1929.]

The Low Veld between Hectorspruit and Peggs Peak Mine. The trees are mainly *Pterocarpus angolensis* DC. (PAPILIONACEAE); *Sclerocarya caffra* Sond. (ANACARDIACEAE), *Trichilia emetica* Vahl (MELIACEAE), and *Ficus Sycomorus* Linn. (MORACEAE).

Ormocarpum setosum B. Davy (PAPILIONACEAE) (No. 2529), a shrub 10 ft., with very densely setose fruits; *Triumfetta hirsuta* Sprague & Hutch. (TILIACEAE) (No. 2532), leaves narrowly oblong, thinly stellate-pubescent below, and panicles of light fruits covered with slender pilose bristles.

We stayed the night at Hectorspruit,² and my thrilling experience there deserves to be set up under a special heading.

¹ Also collected: No. 2525, *Geigeria Burkei* Harv. (COMPOSITAE); 2526, *Justicia Melampyrum* S. Moore (ACANTHACEAE); 2527, *Orthosiphon serratum* Schltr. (LABIATAE); 2528, *Pretrea zanguebarica* (Lour.) J. Gay (PEDALIACEAE), see p. 329; 2530, *Syzygium guineense* DC. (MYRTACEAE); 2531, *Pachycarpus appendiculatus* E. Mey. (ASCLEPIADACEAE); 2533, *Oldenlandia Bojeri* Hiern (RUBIACEAE).

² Collected here: No. 2534, *Anthericum patulum* Bak. (LILIACEAE); 2535, *Oxygonum calcaratum* Burch. (POLYGONACEAE).

My Second "Snake"

We arrived at Hectorspruit very tired, and as it was a wet evening, we were glad to seek the shelter of the small hotel. Feeling rather worn out with the strenuous day and the moist heat, I soon retired to bed. Each of us was allotted a separate room on the ground floor and opening on to the verandah. There were no windows, so the door had to be left open.

I was somewhat dubious about that open door—a common enough thing in South Africa, but rather disturbing to one from a London suburb, where doors and ground-floor windows are always locked at night. I was soon in the deep sleep that comes from complete physical exhaustion, and in which dreams have no place. I awoke very suddenly. There was no interval between sleep and awakeness, no half dreams. I was at once very much awake, and acutely conscious that something was wrong. The darkness was intense. I could see nothing, not even the open doorway. I listened intently. Something or someone was in the room!

I lay very still. From the wall on my right I could hear a scraping noise, like a heavy body dragging itself along the floor. Could it be a snake crawling around the room; perhaps a huge python? The drying papers scattered on the floor rustled as the *thing* crept over them. Now it was getting near the bed-post by my head. Would it pass by, or would it start to climb to my pillow? If so, I might not be able to move through fright; for I could feel the perspiration trickling down my brow, and not wholly on account of the heat. Had I come all the way from Kew, and travelled safely for thousands of miles in Africa, to be stung, or perhaps crushed, by this unknown creepy thing?

The scraping noise continued, and, to my great relief, it seemed to have passed by the head of the bed, and was right underneath me. Something hard struck the farther bed-post. It could scarcely be a snake, but what was it? The noisome beast, whatever it was, continued its progress round the room. At length it approached the door, and I remembered this was hinged on the inside, and that, if pushed against, it would probably close, perhaps automatically lock itself, and then I should be shut in with the monster, and none would hear my cries. My fears were soon justified, and the door slammed to with a loud crash—or so it seemed in the dead silence of the night. The intruder continued its perambulation round the room, and began to approach again, and the possibility of its crawling over the bed recurred. This time it seemed to settle right underneath me and lie quiet for a time, apart from an occasional tap on the floor.

At length I could stand the suspense no longer, and resolved to make an attempt at escape. For this purpose I rose as quietly as possible to my feet, the bed creaking loudly, and I gathered the bed-clothes around my waist as if preparing for a sack race. Thus protected, I sprang to the floor and leapt in the direction of the door, which I opened as quickly as I could, grabbing my coat from the hook as I did so. Once outside, my courage returned, and I went back to the room armed with a candle, which revealed not a huge python, but a harmless though monster *tortoise*, calmly reposing and blinking at me from under the bed.

Needless to say I bundled him out on the verandah, not caring, and even half hoping, that he might visit a few more of the bedrooms along the stoep whence occasional snores were the only signs of life.



“ I went back to my room armed with
a candle and discovered —— ! ”

Though I made cautious enquiries the next morning, in case the tortoise had been “ planted ” for my benefit, my companions showed no knowledge of the affair, and seemed to have slumbered on peacefully during the whole of the disturbance.



[Photogr. : I. B. Pole Evans, Jan. 1929.]

Ficus Sycomorus Linn. (MORACEAE), between Barberton and Hectorspruit
(the Author on top of the caravan).



[Photogr. : J. B. Pole Evans, Jan. 1929.]

Aloe Marlothii A. Berg. (LILIACEAE), between Hectorspruit and Komati Poort.

From Hectorspruit we departed the next morning in glorious weather, which soon made me forget the event of the night, and proceeded towards Komati Poort, a spot I was anxious to see because of its association with R. Schlechter. On the way we collected in this Low Veld country a few interesting plants,¹ including some familiar to me even in the *Flora of West Tropical Africa* (see below). But the gem today was *Adenium swazicum* Stapf (APOCYNACEAE) (No. 2544), a large patch of which we found 10 miles from Hectorspruit. It grew in poor soil, with very sparse grass, in a sandy flat in open places among *Acacia nigrescens*, *Euclea undulata*, and *Combretum* spp.; it has a very large underground tuber, and flowers of a deep mauve or crimson colour with a crimson tube. Flowers were collected for figuring in the *Flowering Plants of South Africa*, and a plate appeared in 1937, t. 664. At about 3 miles from Komati Poort we stopped to photograph *Aloe Marlothii* A. Berg. (LILIACEAE), 21 ft. high, of which I am privileged to reproduce Dr. Pole Evans' picture (see above).

Komati Poort is a hot place on the banks of the Komati River, and instead of going to see the Hippo pool, a local attraction, I engaged two boys to carry my things across the railway bridge into Portuguese East Africa. A crowd of native children followed us for some distance, but soon dropped off, and we ascended to the top of the Lebombo mountains, which run north and south, but are here not very high. Although

¹ Also gathered : No. 2536, *Dalbergia melanoxylon* Guill. & Perr. (PAPILIONACEAE); 2537, *Ipomoea crassipes* Hook. (CONVOLVULACEAE); 2538, *Wormskioeldia longipedunculata* Mast. (TURNERACEAE); 2539, *Ipomoea crassipes* Hook. (CONVOLVULACEAE); 2540, *Mundulea sericea* (Willd.) A. Chev.; 2541, *Ormocarpum setosum* B. Davy (PAPILIONACEAE); 2542, *Combretum imberbe* var. *Petersii* Engl. (COMBRETACEAE); 2543, *Cissus quadrangularis* Linn. (AMPELIDACEAE).



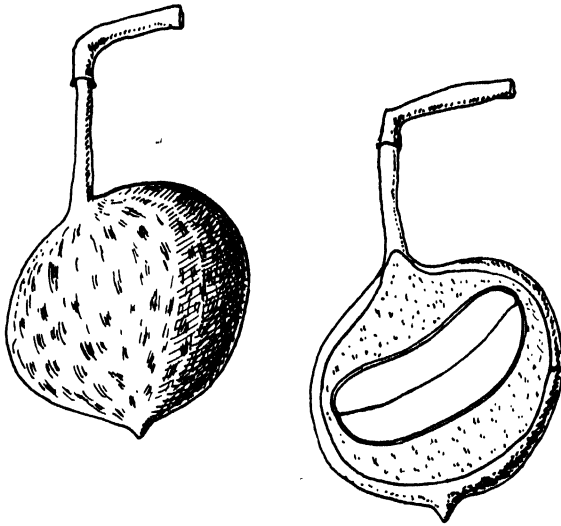
[Photogr. : I. B. Pole Evans, Jan. 1929.]

Adenium swazicum Stapf (APOCYNACEAE), between Hectorspruit and Komati Poort, Transvaal.



[Photogr. by the Author.]

On the borders of Swaziland ; a chief and his family.



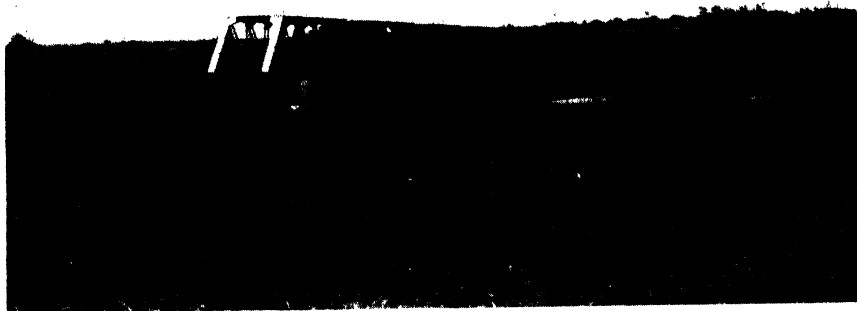
Fruit, and vertical section, of *Cordyla africana* Lour.
(CAESALPINIACEAE), from Komati Poort, N.E.
Transvaal (two-thirds natural size).

I collected only a few species, they were nearly all fairly recently discovered and described. They were : *Triaspis canescens* Engl. (MALPIGHIACEAE) (No. 2545), a shrublet on stony ground, softly pilose all over, with white hairs, narrowly lanceolate leaves, deep-pink flowers



Galpinia transvaalica N.E. Br. (LYTHRACEAE) from the Lebombo Mountains,
Portuguese East Africa.

A, vertical section of flower ; B, calyx and style ; C, vertical section of ovary ;
D, stamens.—After Hook. Ic. Plantarum.



[Photogr. by the Author.]

Bridge across the Komati River at Komati Poort.



[Photogr. by the Author.]

The Komati River from the bridge.

and suborbicular winged fruits; *Orthosiphon serratum* Schltr. (LABIATAE) (No. 2546), herb, 1 ft. high, with ovate-lanceolate serrate pubescent leaves, and mauve flowers with one of the calyx lobes very broad and rounded, mauve; *Euphorbia neopolycnemoides* Pax & K. Hoffm. (EUPHORBIACEAE) (No. 2547), a glabrous much-branched annual herb tinged with purple, linear glaucous-green leaves, involucre white; very similar in habit, *Phyllanthus humilis* Pax (EUPHORBIACEAE) (No. 2548), with ovate-elliptic acute leaves; *Turraea oblancifolia* Bremek. (MELIACEAE) (No. 2549) (see p. 359); *Hermannia boraginiflora* Harv. (STERCULIACEAE) (No. 2550), very small shrublet with stellate indumentum and small obovate toothed leaves, anthers long, acute, mauve; *Galpinia transvaalica* N.E. Br. (LYTHRACEAE) (No. 2551), discovered first by Galpin at French Bob's hill, Barberton, at 2600 ft., and figured in Hooker's *Icones Plantarum*, t. 2375; later it was collected by Schlechter (No. 11,969) at Delagoa Bay in 1898, and by Gomes Sousa at Lorenzo Marques, near the sea at Polana, in 1932; a small tree 14 ft. high, with opposite elliptic leaves and white flowers; each bract bears a large gland (see figure, p. 377); *Sphedamnocarpus transvaalica* (O. Ktze.) B. Davy (MALPIGHIACEAE) (No. 2552), a climber with small subopposite leaves and T-shaped indumentum and clawed petals with jagged edges; *Senecio transvaalensis* Bolus (COMPOSITAE) (No. 2553), with glaucous entire sessile leaves and pink flower-heads on long slender peduncles.

I returned from the Lebombo Mountains to Komati Poort, pleased to have set foot in Portuguese territory, to see the lorry being loaded on to the railway truck, and we travelled back by the evening train, reaching Pretoria the next morning about six o'clock.

It was entirely due to the kindness of Dr. Pole Evans that I had been able to see this interesting country in the North-eastern Transvaal. I had had a grand time through his efforts and those of his two assistants, and with the help of Mr. van Baalen, from the Union Buildings Gardens.

Chapter XX

BOTANISING AT HORN'S NEK AND NEAR IRENE

ON Tuesday, 15th January, I was again indebted to Pretoria botanists for arranging an excursion to Horn's Nek, in the Magaliesberg, some few miles north-west of Pretoria. I was accompanied by Miss Verdoorn, of the National Herbarium, and by Mr. Van Baalen and Mr. Gunn, of the Union Buildings Gardens staff.

A short account of the Magaliesberg is given by A. C. Léemann in Karsten and Schenck, *Vegetationsbilder* (vol. 22: Heft. 3, tt. 13-18 (1931)), with some excellent photographs of the Wonderboom, *Ficus Pretoriae* B. Davy (see large photograph).

The following enumeration of plants collected by me will give the reader some idea of the rather rich and varied flora to be found there about this season. Among the most interesting was *Clematopsis Stanleyi* (Hook. f.) Hutch. (RANUNCULACEAE), a plant I was delighted to see in the field, because I had resuscitated the genus some years before in a paper in the *Kew Bulletin*.¹

The Genus *Clematopsis* a veritable "Missing Link"

Though Africa, as stated previously, has few really primitive types of plants, apart from its Cycads and a few Conifers, it has some very interesting links and relics. One of the most interesting links is *Clematopsis*, the significance of which I discovered early on in my studies of the phylogeny of flowering plants.

Up to that time the large genera *Anemone* and *Clematis* were regarded as being quite distinct, though of course closely related. *Anemone* had radical or alternate leaves and imbricate sepals, *Clematis* had opposite leaves and induplicate-valvate sepals. But on examining *Clematis* for indications as to its origin, it was interesting to find that certain African and Mascarene species had apparently markedly imbricate sepals. This aestivation appeared superficially to be of the ordinary imbricate type, but on dissection of the buds of several species the types of aestivation shown in the diagram (p. 382) were found to occur. In No. 1, drawn from a flower of *Clematopsis scabiosifolia*, the overlapping is simply imbricate, as in *Anemone*; in No. 2—that of *C. speciosa*—it is partly imbricate and partly induplicate-valvate; in No. 3—*C. Stanleyi*—we see a gradation which links up with No. 4—*C. Kirkii*—wherein the aestivation approaches most nearly to that of typical *Clematis*, except that the alternate overlapped margins are not inflexed, like the overlapping margins.

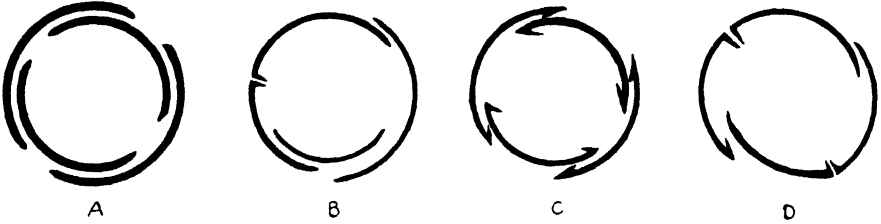
As a valvate aestivation has no doubt been derived from an imbricate one, the phyletic importance of this remarkable transition should not be lost sight of, linking up, as it clearly does, the tribes ANEMONEAE (through *Anemone* § *Pulsatilla*) and CLEMATIDEAE.

¹ Hutchinson, "Clematopsis, a Primitive Genus of Clematideae", *Kew Bulletin* 1920: 12-22, with figs.



Clematopsis Stanleyi (Hook.) Hutch. (RANUNCULACEAE) (after Bot. Mag.); the genus is a link between *Anemone* and *Clematis*.

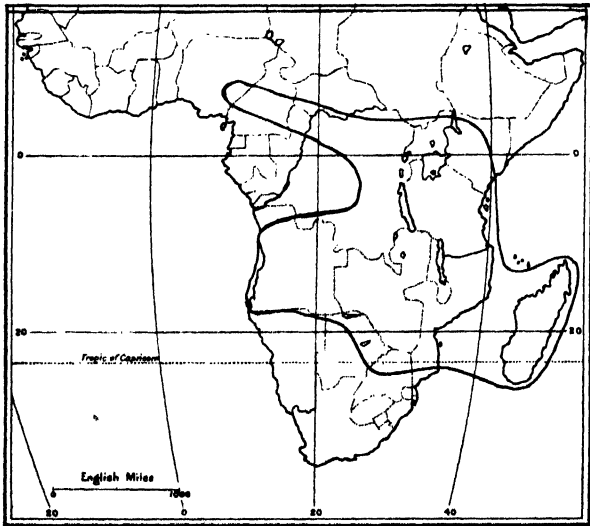
With regard to the difference of the alternate and opposite leaves of *Anemone* and *Clematis*, respectively, there is an occasional occurrence which seems to strengthen the view as to the intermediate position of *Clematopsis*. For when *Clematopsis Stanleyi* is cultivated, it sometimes produces alternate leaves, thereby becoming to all intents and purposes a species of *Anemone*, though all wild specimens I have examined have opposite leaves. In addition, three Angolan species have an involucre of leaves, which is another "Anemone feature".



Diagrams showing different types of aestivation of *Clematopsis* (RANUNCULACEAE).

A, *Clematopsis scabiosifolia* (DC.) Hutch.; B, *C. speciosa* Hutch.; C, *C. Stanleyi* (Hook.) Hutch.; D, *C. Kirkii* (Oliv.) Hutch.

In view of the above, therefore, it seems a probability that the old plateau of Africa and Madagascar has been the breeding ground for the evolution of at least a part of *Clematis*, whence it may have spread into the Northern Hemisphere. I give a map showing the range of *Clematopsis*, most of the species occurring in Angola, where in some places on the plateau they form almost a dominant feature of the vegetation. Welwitsch mentions that large tracts of pasture ground, amidst the forests, look at a distance as if covered with snow, due to the flowers of *Clematopsis*.



Range of *Clematopsis* (RANUNCULACEAE), on the plateau of Africa and Madagascar, a link between *Anemone* and *Clematis*.

**List of Plants Collected at Horn's Nek, Magaliesberg,
15th January, 1929**

LIGNOSAE (WOODY DICOTYLEDONS)

- MIMOSACEAE**—*Elephantorrhiza elephantina* (Burch.) Skeels (Nos. 2571, 2597): dwarf from a woody rhizome, only up to 9 ins. high; leaflets linear, with the midrib to one side, glabrous; fruits flat, 15 cm. long, 5 cm. broad, nervose-reticulate.
- PAPILIONACEAE**—*Indigofera angustiloba* Bak. f. (No. 2577): leaflets about 5 pairs, hirsute with appressed hairs; racemes small and short, flowers pink.
- I. oxytropis** Benth. (No. 2579): low shrublet; leaflets about seven pairs, softly pubescent; flowers reddish-scarlet; fruits softly pubescent, beaked, 1.3 cm. long. *Tephrosia elongata* E. Mey. var. *pubescens* Harv. (No. 2558): leaflets three, linear-lanceolate, with thick margins; flowers orange-red; fruits like small narrow peas. *T. oblongifolia* E. Mey. (No. 2554): stems prostrate; leaves pinnate, leaflets lanceolate-elliptic, pubescent; racemes slender; flowers greenish-yellow; pods silky. *Vigna stenophylla* (No. 2559): stems weak and straggling; leaflets broadly linear, the lower pair hastate at the base; pods linear. *Sphenostylis angustifolia* Sond. (No. 2588): trifoliolate; leaflets oblong-lanceolate, nearly glabrous; peduncles about 2-flowered; flowers crimson; style flattened at the tip. *Rhynchosia monophylla* Schltr. (Nos. 2568, 2574): trifoliolate or unifoliolate; leaflets broadly elliptic, acute subcordate at the base; stipules large, ribbed; flowers axillary. *R. nitens* Benth. (No. 2587): small shrub, silky tomentose all over; leaflets ovate, subcordate; flowers bright yellow. *Dolichos axillaris* E. Mey. (No. 2585): leaflets ovate, appressed-pubescent; flowers greenish-yellow.
- CAPARIDACEAE**—*Cleome maculata* (Sond.) Burt Davy (No. 2595): leaflets three, linear, acute; flowers deep mauve pink.
- TILIACEAE**—*Triumfetta Sonderi* Fic. & Hiern (No. 2600) (see figure, p. 292).
- MALVACEAE**—*Hibiscus atromarginatus* Eckl. & Zeyh. (No. 2561): leaves digitately partite, segments coarsely toothed; pedicels longer than the petioles; epicalyx of filiform pilose bracts twice as long as the calyx; corolla pale yellow.
- HYPERICACEAE**—*Hypericum aethiopicum* Thunb. (No. 2582): dwarf from a woody rhizome; leaves sessile, ovate, gland-dotted; flowers yellow, spotted with black dots.
- CELASTRACEAE**—*Gymnosporia tenuispina* Sond. (No. 2581): a small shrub, with spine-tipped short branchlets, narrowly linear-oblongate entire leaves and dull reddish-green fruits.
- HIPPOCRATEACEAE**—*Salacia Rehmannii* Schinz (No. 2557): stems short, from a woody stock; leaves alternate, oblanceolate, slightly crenulate; fruits obovoid, 3 cm. long, red, tuberculate.
- SANTALACEAE**—*Thesium magalismontanum* Sond. (No. 2592): stems numerous, from a woody rootstock, glaucous; flowers scattered along the whip-like branchlets.
- ANACARDIACEAE**—*Rhus megalismontana* Sond. (No. 2555): dwarf up to 1 ft.; branchlets purplish; leaflets oblanceolate, leathery, 2.5 cm. long; berries shining.
- ASCLEPIADACEAE**—*Asclepias glaucophylla* Schltr. (No. 2599): leaves ovate-cordate, sessile, glaucous.
- RUBIACEAE**—*Gardenia Rothmannia* Linn. f. (No. 2572): shrub 12 ft.; leaves elliptic, with pockets of hairs in the axils of the nerves; flowers subsessile, white, spotted; fruits globose, 5 cm. diam. *Fadogia fragrans* Robyns (No. 2563): leaves three in a whorl, oblanceolate, paler below and densely papillous-puberulous; fruits green. *Pygmaeothamnus Zeyheri* Robyns (No. 2573): very dwarf; leaves oblanceolate, bluntly acuminate; fruits obliquely obovoid, stipitate, fleshy. *Anthospermum pumilum* Sond. (No. 2578): woody and much branched from the base; leaves small and linear; fruits papillous.

HERBACEAE (HERBACEOUS DICOTYLEDONS)

- RANUNCULACEAE—*Clematopsis Stanleyi* Hutch. (No. 2567) (see figure, p. 381).
 CARYOPHYLLACEAE—*Dianthus micropetalus* Ser. (No. 2580): leaves acicular, scabrid on the margin; flowers white.
 FICOIDACEAE—*Limeum natalense* Schellenb. (No. 2565): spreading herb, with small pale white flowers in clusters; seeds reticulate.
 COMPOSITAE—*Aster muricatus* Less. (No. 2560): woody at the base; branches very slender; leaves acicular; rays mauve. *Helichrysum cerastoides* DC. (No. 2556): dwarf and densely woolly; bracts white. *Vernonia capensis* (Houtt.) Druce (No. 2583) (see p. 260). *Ursinia annua* Less. (No. 2593). *Berkheya magalismontana* Bolus (No. 2570): leaves narrow, with spine-tipped lobes, white-woolly below; heads yellow, paniculate. *Dicoma Gerardii* Harv. (No. 2569): woody; leaves linear, white-felted below; flower-heads mauve.
 CONVOLVULACEAE—*Ipomoea angustifolia* Jacq. (No. 2562): stems almost filiform; leaves linear, hastate-dentate at the base; flowers pale yellow.
 SCROPHULARIACEAE—*Striga orobanchoides* Benth. (No. 2564): leaves linear, ciliate-pectinate; flowers mauve-pink. *S. bilabiata* (Thunb.) O. Ktze. (No. 2586): leaves setulose; flowers mauve.
 PEDALIACEAE—*Pretrea zanguibarica* J. Gay (Nos. 2589, 2598) (see p. 329).
 LABIATAE—*Plectranthus hirtus* Benth. (No. 2566): 1 ft. high, leaves ovate, coarsely crenate, softly pubescent below; flowers mauve. *Beclium angustifolium* (Benth.) N.E. Br. (No. 2584): 1 ft. high; leaves linear, puberulous, gland-dotted; flowers greenish-white.

MONOCOTYLEDONS

- COMMELINACEAE—*Commelina Livingstonei* Clarke (No. 2594): small herb with linear leaves, broadly ovate sharply beaked bracts and blue flowers.
 LILIACEAE—*Eucomis undulata* Ait. (No. 2601): easily recognised in the family by the crown of leaves above the dense raceme of green flowers.
 IRIDACEAE—*Gladiolus Saundersii* Hk. f. (No. 2591): 2 ft. high; leaves 2 cm. broad; flowers red, speckled.
 ORCHIDACEAE—*Eulophia Dregeana* Lindl. (No. 2596): leaves sickle-shaped; stem-leaves bract-like, overlapping, acute; flowers with a very short spur.
 CYPERACEAE—*Kyllinga alba* Nees (No. 2575): tufted; heads subglobose, white, about 1.5 cm. diam.
 GRAMINEAE—*Andropogon amplexans* Nees (No. 2576): sheaths and leaf-blades softly pilose; spikes two, unequal.

Collecting between Irene and Johannesburg

Wednesday, 16th January, was devoted to technical work. A day's collecting often means as much time spent in labelling, drying and changing the plants and renewing the supply of dry paper. Rarely has a collector a superabundance of paper, and when newspapers are wanted they are usually not to be had at an average South African hotel.

On 17th January I made an excursion alone on the road from Irene to Johannesburg, so that I should not have to burden my presses at the outset of my journey south, the time for which was rapidly approaching. In open grass veld a few miles south of Irene a plant press was soon filled with a representative collection,¹ the following being the most striking: *Ipomoea Greenstockii* Rendle (CONVOLVULACEAE) (No. 2604), branches prostrate, densely pilose, leaves ovate, pilose, corolla deep mauve-purple, about 4 cm. long; *I. oblongata* E. Mey. (No. 2610), very

¹ Also collected: No. 2603, *Eriospermum natalense* Baker (LILIACEAE); 2605, *Polygala hottentotta* Presl (POLYGALACEAE); 2606, *Oxygonum Dregeanum* Meisn. (POLYGONACEAE); 2607, *Hebenstreitia elongata* Bolus (SELAGINACEAE); 2608, *Brachiaria serrata* Stapf (GRAMINEAE); 2609, *Cassia mimosoides* Linn. (CAESALPINIACEAE).

similar, but flowers twice as large; *Indigofera oxytropis* Benth. (PAPILIONACEAE) (No. 2612), with deep red-carmine flowers; a plant like a Scotch "Bluebell", *Wahlenbergia undulata* A.DC. (CAMPANULACEAE) (No. 2613), erect, about 1½ ft., stem leaves narrow, with very wavy margins, flowers blue, on long stalks; *Pleiospora cajanifolia* Harv. (PAPILIONACEAE) (No. 2614), a shrub with filiform stipules, obovate very mucronate leaflets, and clusters of pale-yellow flowers; a pretty white *Aster*, *A. Peglerae* Bolus (COMPOSITAE) (No. 2615), with gland-dotted rather coarsely toothed ovate-lanceolate sessile leaves, and rather large heads with white rays, and an orange yellow *Helichrysum*, *H. acutatum* DC. (COMPOSITAE), with woolly oblanceolate leaves.

Farther south, near Kempton Park,¹ and in a swampy meadow by the roadside, another batch was collected, including *Oxalis setosa* E. Mey. (OXALIDACEAE) (No. 2617), leaflets broadly cuncate-obovate, flowers deep pink; *Chironia palustris* Burch. (GENTIANACEAE) (No. 2618), with a few radical oblanceolate-spathulate leaves and a long-stalked cyme of few deep pink flowers with spirally twisted anthers; and a handsome Asclepiad, *Xysmalobium undulatum* R.Br. (No. 2626), with softly pubescent lanceolate leaves undulate on the margins, and shortly stalked axillary clusters of flowers, the corolla densely setose inside.

¹ Also collected: No. 2619, *Eulophia aemula* Schltr. (ORCHIDACEAE); 2620, *Asclepias gibba* (D. Dietr.) Schltr. (ASCLEPIADACEAE); 2621, *Schizoglossum periglossoides* Schltr. (ASCLEPIADACEAE); 2622, *Vernonia hirsuta* Sch. Bip. (COMPOSITAE); 2623, *Alepidia longifolia* E. Mey. (UMBELLIFERAE); 2624, *Argyrolobium tuberosum* Eckl. & Zeyh. (PAPILIONACEAE); 2625, *Sutera aurantiaca* Hiern (SCROPHULARIACEAE); 2627, *Pennisetum sphacelatum* (Nees) Dur. & Schinz (GRAMINEAE).

Chapter XXI

EXCURSION TO THE MAGALAKWIN RIVER AND THE BLAAUWBERG

ON Monday evening, 21st January, I left Irene with Dr. Pole Evans by the night train for Potgietersrust. Just south of Pretoria the Fountains Valley was keeping up to the reputation of its name, for here our train was held up for one and a half hours by a terrific downpour.

We arrived at Potgietersrust at seven o'clock the next morning, unloaded the Botanical Survey caravan, and set off for Swerweskraal, 34 miles to the north-west (23° 35' S., 28° 80' E.). We collected on the way *Ipomoea albivenia* G. Don (CONVOLVULACEAE) (No. 2628), climbing over *Rhus*, with rounded leaves woolly on the nerves below, and large



[Photogr. : I. B. Pole Evans, Jan. 1929.]

Ficus Sonderi Miq. (MORACEAE) in the Matala Hills.

handsome flowers, arriving at the farm of Mr. and Mrs. Neethling, who had kindly invited us to visit them. They live in typical bush veld, and we made a small collection on the farm ¹ and in the Matala Hills nearby, including *Terminalia sericea* Burch. (COMBRETACEAE) (No. 2730) (see figure, p. 295); and *Maerua angolensis* DC. (CAPPARIDACEAE), No. 2638, a tree 18 ft. high.

¹ Also collected No. 2629, *Antherothamnus Pearsonii* N.E. Br. (SCROPHULARIACEAE); 2631, *Combretum transvaalense* Schinz (COMBRETACEAE); 2632, *Heeria paniculosa* (E. Mey.) O. Ktze. (ANACARDIACEAE); 2633, *Acacia Giraffae* Burch. (MIMOSACEAE); 2634, *Viscum Spragueanum* B. Davy (SANTALACEAE); 2635, *Viscum rotundifolium* Thunb.; 2636, *Aster luteus* (N.E. Br.) Hutch. (COMPOSITAE); 2637, *Cyathula crispa* Schinz (AMARANTACEAE).



[Photogr. : I. B. Pole Evans, Jan. 1929.]

Euphorbia ingens E. Mey. (EUPHORBIACEAE), in the Matala Hills, North West Transvaal.



[Photogr. : I. B. Pole Evans, Jan. 1929.]

Euphorbia ingens in the Matala Hills.



[Photogr. : I. B. Pole Evans, Jan. 1929.]

Looking north from the Matala Hills towards the Blaauwberg, with *Euphorbia ingens* E. Mey. (EUPHORBIACEAE) in the foreground.



[Photogr. : I. B. Pole Evans, Jan. 1929.]

Bridge over the Magalakwin River, a tributary of the Limpopo.

In the Matala Hills,¹ covered with huge granite boulders, I was interested to see *Ficus Sonderi* Miq. (MORACEAE) (No. 2639), about 15 ft. high, with suborbicular to broadly elliptic hairy leaves cordate at the base; figs sessile, the size of a pea, woolly; *Tapiphyllum parvifolium* (Sond.) Robyns (RUBIACEAE) (No. 2641).

I include some photographs, taken by Dr. Pole Evans, of the Matala Hills, and one showing the view towards the Blaauwberg, with fine specimens of *Euphorbia ingens* E. Mey. (EUPHORBIACEAE) in the foreground.

On the neighbouring Helbron Farm a few more plants were gathered,² and early next morning we parted from our kind hosts and



[Photogr. : I. B. Pole Evans, Jan. 1929.]

The Magalakwin River from the bridge.

set off again to the north-west, collecting at 28 miles³ and 44 miles⁴ distance in the direction of the Magalakwin River bridge. At the bridge the only plants to be collected were *Adenia senensis* (Klotzsch) Engl. (PASSIFLORACEAE) (No. 2657), with orange-yellow fruits, and *Commelina Krebsiana* Kunth (COMMELINACEAE) (No. 2658), a densely pubescent herb with yellow flowers. We also collected at the Main

¹ Also collected : No. 2640, *Sarcostemma viminalis* R. Br. (ASCLEPIADACEAE); 2642, *Senecio barbertonicus* Klatt (COMPOSITAE); 2643, *Rhoicissus Schlechteri* Gilg & Brandt (AMPELIDACEAE).

² Collected here : No. 2644, *Loranthus rubromarginatus* Engl. (LORANTHACEAE); 2646, *Gymnosporia ulicina* (Burch.) (CELASTRACEAE); 2647, *Rhoicissus Schlechteri* Gilg & Brandt (AMPELIDACEAE); 2647a, *Kirkia Wilmsii* Schltr. (SIMARUBACEAE) (see p. 329); 2648, *Commiphora pyracanthoides* Engl. (SIMARUBACEAE).

³ Collected here : No. 2649, *Triaspis Nelsonii* Oliv. (MALPIGHIACEAE); 2650, *Commiphora pyracanthoides* Engl. (SIMARUBACEAE); 2651, *Eriocephalus pubescens* DC. (COMPOSITAE).

⁴ Collected here : No. 2652, *Trochomeria debilis* Hook. f. (CUCURBITACEAE); 2653, *Cadaba termitaria* N.E. Br. (CAFFARIDACEAE); 2654, *Gossypium africanum* Watt (MALVACEAE); 2656, *Dolichos pratensis* (E. Mey.) Taub. (PAPILIONACEAE).



Male inflorescence and fruiting branchlet of *Croton megalobotrys* Müll. Arg. (*C. Gubouga* S. Moore) (EUPHORBIACEAE), found along rivers of the Northern Transvaal and Rhodesia.

A, base of leaf, showing glands; B, stellate hairs from the leaf; C, male flower; D, petal of male flower; E, stamen; F, female flower. (The inflorescence may be either unisexual or bisexual.)

Drift ¹ and at Wagon Drift ² where we again crossed the river by the

¹ Also collected: No. 2659, *Geigeria passerinoides* Harv. (COMPOSITAE); 2660, *Justicia flava* Vahl (ACANTHACEAE); 2661, *Solanum panduraeforme* E. Mey. (SOLANACEAE).

² Also collected: No. 2662, *Rhynchelytrum villosum* (Parl.) Chiov. (GRAMINEAE); 2663, *Panicum maximum* Jacq. (GRAMINEAE); 2665, *Jasminum mauritianum* Bojer (OLEACEAE); 2666, *Combretum imberbe* Wawra var. *Petersii* Engl. (COMBRETACEAE); 2667, *Croton megalobotrys* Müll. Arg. (see above); 2668, *Hibiscus Schinzii* Gürke (MALVACEAE); 2669, *Grewia monticola* Sond.; 2670, *Tephrosia Burchellii* B. Davy; 2671, *Cleome hirta* (Klotzsch) Oliv.; 2672, *Tylophora cordata* (Thunb.) Druce (Asclepiadaceae); 2673, *Terminalia prunioides* Laws (COMBRETACEAE); 2674, *Acacia pennata* Willd. (MIMOSACEAE); 2675, *Catophractes Alexandri* Don (BIGNONIACEAE).

ford. At Wagon Drift I was very pleased to find in fruit a *Croton* (EUPHORBIACEAE) which I was able to recognise as the same as one I had dealt with for the *Flora of Tropical Africa*—the *Croton Gubouga* of Spencer Moore from the Zambesi basin. Here there were numerous trees up to 25 ft. high, and I tasted the fresh bark to test its flavour, for shortly before that time it had been reported to be valuable in cases of malaria.¹ It caused a burning sensation in my throat and mouth. The species, however, should now be called *C. megalobotrys* Müll. Arg. and I give a black-and-white figure of it on p. 390.

Conspicuous on the banks of the river were large leafless trees of *Acacia albida* Del. (MIMOSACEAE) marking by their nakedness the



[Photogr. : I. B. Pole Evans, Jan. 1929.]

Wagon Drift, Magalakwin River, showing the track of the botanical caravan.

course of the river for miles. Between Wagon Drift and the Blaauwberg we collected only a few more species, including *Sericorema sericea* (Schinz) Lopr. (AMARANTACEAE) (No. 2676), a strict woody plant about a foot high with long-silky perianth in fruit; *Dicoma tomentosa* Cass. (COMPOSITAE) (No. 2677), with narrowly elliptic denticulate leaves, and spine-tipped involucre bracts, woolly outside; and a pretty *Nerine*, *N. laticoma* (Ker) Dur. & Schinz (AMARYLLIDACEAE) (No. 2679), this being the correct name for the plant called in the *Flora Capensis* *N. lucida* Herb. and *N. flexuosa* Herb. var. *Saundersoni* Baker, and recently described by Miss Barker as *N. falcata*.

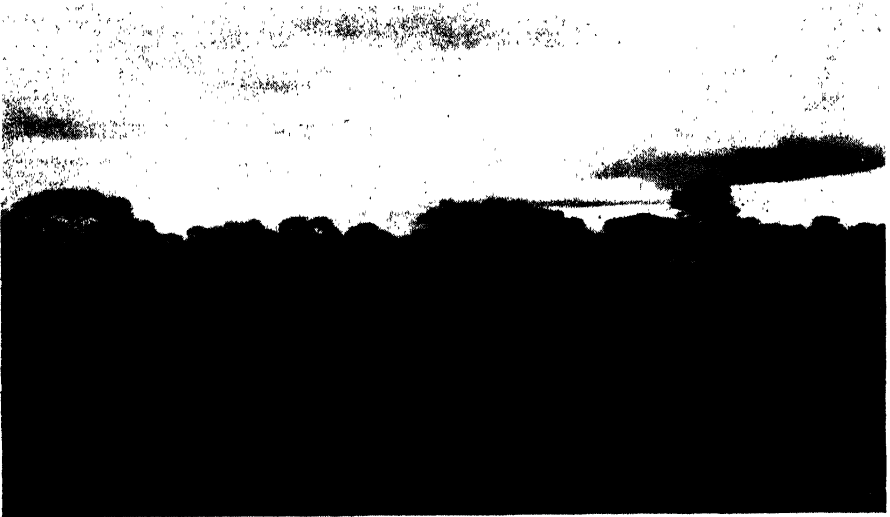
Our progress near the Blaauwberg was greatly hindered by the soft black turf, and our lorry frequently sank up to the hubs and we had to dig out the wheels every now and then. As further rain threatened, we deemed it wise to retreat before the ground became any softer.

¹ According to Watt & Breyer-Brandwijk, *Med. & Pois. Pl. of Southern Africa*, p. 100, the bark is used by natives in the Transvaal and Portuguese East Africa, and was at one time popular among Europeans as a malaria remedy, the powdered bark being made into pills. In Gazaland the bark is used as a fish poison.



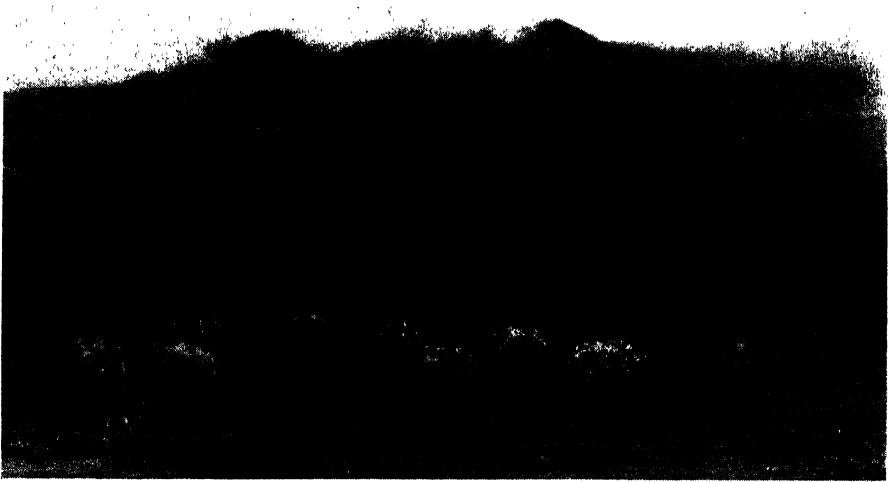
[Photogr. : I. B. Pole Evans, Jan. 1929.

Acacia albida Del. (MIMOSACEAE) (middle), and *Croton megalobotrys* Müll. Arg. (EUPHORBIACEAE) on the Magalakwin River.



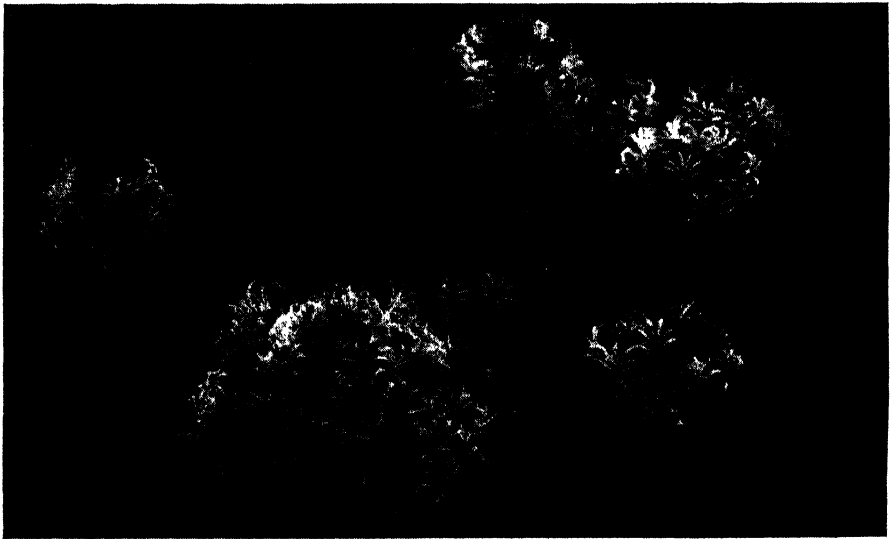
[Photogr. : I. B. Pole Evans, Jan. 1929.

Vegetation between the Magalakwin River and the Blaauwberg.



[Photogr. by the Author, Jan. 1929.]

Nerine laticoma (Ker) Dur. & Schinz (AMARYLLIDACEAE), on the flats north of the Blaauwberg.



[Photogr. : I. B. Pole Evans, Jan. 1929.]

Nerine laticoma (Ker) Dur. & Schinz (AMARYLLIDACEAE), north of the Blaauwberg.

This was a fascinating region, and I was very disappointed not to be able to explore the Blaauwberg. It has since been visited, however, by Léemann, who has published an account of it in Karsten and Schenck *Vegetationsbilder*.¹ The mountain gets its name from the moist atmosphere, which imparts a blue tinge from a distance. It is a south-western extension of the Zoutpansberg, being about 30 miles long, and there is a plain as wide between the two ranges. This plain of dry bush-veld vegetation lies at about 3000 ft. altitude, and the highest point in the Blaauwberg is 6600 ft.

Near streams in the lower regions occur *Syzygium cordatum* Hochst. (MYRTACEAE), common farther east, and *Salix Wilmsii* Seem. (SALICA-



[Photogr. : I. B. Pole Evans, Jan. 1929.]

Country north of the Blaauwberg.

CEAE). The forest covering the slopes and valleys is dominated by an *Acacia*, *A. Woodii* B. Davy (MIMOSACEAE), and here and there a tall Aloe, *A. Marlothii* (LILIACEAE). Climbers are represented by *Pterolobium exosum* (Gmel.) Bak. f. (CAESALPINIACEAE), which makes such a brave show of colour in winter in Wylie's Poort; others are *Rhoicissus capensis* Burm. f. (AMPELIDACEAE), and *Boerhaavia pentandra* Burch. (NYCTAGINACEAE).

The mist belt occurs at 4000–5000 ft. altitude, and here grows a real forest, with large-leaved species of *Dombeya*, the stems and rocks being covered with *Usnea barbata*. At the top of the forest, and within the influence of the mist-belt, grows *Chrysophyllum magalismontanum* Sond. (SAPOTACEAE), which exists in the Magaliesberg under very arid conditions.

The mist belt, according to Léemann, extends over the whole

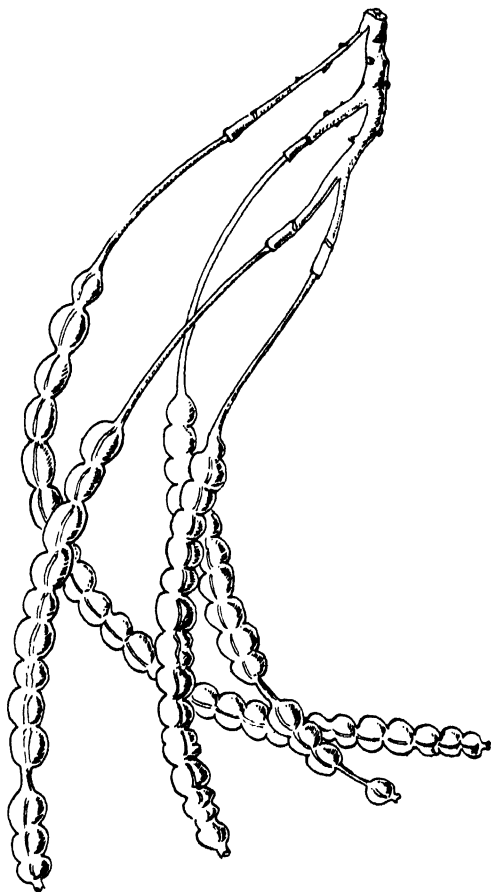
¹ A. C. Léemann in Karsten and Schenck *Vegetationsbilder*, 24: Heft 8, tt. 43–48 (1935).



[Photogrs. by the Author.]

The lorry caravan in difficulties in the black turf north of the Blaauwberg.

mountain plateau, on which are found such xerophytic plants as *Aloe*, *Crassula*, etc. Trees on the plateau are *Ficus craterostoma* Warb. (MORACEAE), *Cussonia* sp. (ARALIACEAE), *Syzygium Legatii* B. Davy (MYRTACEAE), and a *Protea* sp.¹ A heath occurs here, *Erica Woodii* Bolus (ERICACEAE), and several species of *Helichrysum* (COMPOSITAE), and in dry places *Selaginella rupestris* Spreng.



Fruits of *Maerua angolensis* DC. (CAPPARIDACEAE); a bushy tree 14 ft., from north of the Blaauwberg, Northern Transvaal.

The massif above the plateau, and culminating in the summit, about 1600 ft. above, shelters diminutive specimens of *Widdringtonia Whytei* Rendle (CUPRESSACEAE) only about 6 ft. high, just as I have seen them 5 miles west of Wylies Poort. The small *Helichrysum caespititium* Sond. (COMPOSITAE) and *Thesium disparile* N.E. Br. (SANTALACEAE) are very prevalent in this region. There also grows here a miniature arboretum of *Myrothamnus flabellifolia* Welw. (MYROTHAMNACEAE) (see p. 291).

We had time to collect only about a dozen plants on the flats north

¹ In similar country 5 miles west of Wylie's Poort we found two species of *Protea*, *P. abyssinica* Willd. and *P. Roupelliae* Meisn.

of Blaauwberg, all of them interesting species. These were *Grewia villosa* Willd. (TILIACEAE) (No. 2680), a small bush near our camp, with Corylus-like, closely reticulate leaves; *Balanites australis* Bremek. (SIMARUBACEAE) (No. 2681), since collected and described by Dr. Bremekamp, who found it at Saltpan and Waterpoort, a bush 8-10 ft. high, with small, obovate, twin leaflets and small green flowers; *Cordia Gharaf* Ehrenb. (EHRETIACEAE) (No. 2682), a shrub up to 12 ft., with small, obovate, slightly toothed leaves and small, acute, ovoid fruits; widely distributed from here northwards to the Nile districts; *Jatropha setifera* Hutch.¹ (EUPHORBIACEAE) (No. 2683), a new species collected twice previously in the Transvaal, in 1916 by *Pole Evans* (Gov. Herb. No. H. 13,229) at Doornpoort, and by *Galpin* (M. 607), in black turf on Vogelstruispan, Waterberg; a herb 18 in. high from a rhizome, the leaves deeply pinnately divided and variably setose below; *Gossypium africanum* Watt (MALVACEAE) (No. 2684), an indigenous cotton; *Calostephane divaricata* Benth. (COMPOSITAE) (No. 2685), a herb with winged stems, ovate coarsely toothed leaves, yellow flower-heads, and a short jagged pappus; *Celosia scabra* Schinz (AMARANTACEAE) (No. 2686), with pink spikes; *Cissus puberula* C.A. Sm. (AMPELIDACEAE) (No. 2687), densely puberulous all over; *Peristrophe bicalyculata* (Vahl) Nees (ACANTHACEAE) (No. 2688), setose at the nodes, leaves narrowly lanceolate, corolla bilabiate, carmine; stamens 2; and further examples of *Nerine laticomia* (Ker) Dur. & Schinz (AMARYLLIDACEAE) (No. 2689), with large pink flowers with crimson ribs; *Crotalaria Burkeana* Benth. (PAPILIONACEAE) (No. 2690), with greenish-yellow flowers; *Maerua angolensis* DC. (CAPPARIDACEAE) (No. 2691), a small bushy tree, 14 ft., with long necklace-like fruits (see figure, p. 396), and *Rhigozum brevispinosum* O. Ktze. (BIGNONIACEAE) (No. 2692), a shrub with knotted branches, the narrow hairy leaves clustered on arrested branchlets, and membranous fruits with winged seeds.

The flora of part of the area which lies between the Blaauwberg and the main mass of the Zoutpansberg was investigated by Miss Obermeijer, Dr. Schweickerdt and Miss Verdoorn in November 1932, when they collected 438 specimens, mainly on the farm Zoutpan, the farm Eyem (to the west), and via Booysen's farm Chapudi to Waterpoort. Schweickerdt and Verdoorn made a second trip to the Zoutpan farm in April 1934, and also collected at Duvenhage's Pan near Amisfort, obtaining 252 specimens. An enumeration of the plants collected will be found in *Bothalia*, 3 : 223-258 (1937).

Another paper recently published is Bremekamp, "Merkwürdige Sukkulentypen aus dem nördlichen Transvaal", in Karsten and Schenck *Vegetationsbilder* 23 : Heft 3, tt. 13-18 (1932).

¹ *Jatropha setifera* Hutch. sp. nov.

Herba basi lignosa usque ad 35 cm. alta; caules glabri. Folia breviter petiolata, 12-15 cm. longa, 8-10 cm. lata, pinnatipartita, segmentis oblongis irregulariter dentatis infra glauco-viridibus in costa et nervis plus minusve setosis; stipulae setosae. Cymae pauciflorae, bracteis setosis. Sepala lineari-oblonga, 8 mm. longa, glabra. Corolla vix 1 cm. longa; lobi oblongi, glabri. Ovarium glabrum. Fructus 1.3 cm. longus, verrucosus; semina oblonga, maculata, 1 cm. longa, basi carunculo magno multifido instructa.

Transvaal : Doornpoort, 4th December, 1916, *Pole Evans* in *Nat. Herb. Pretoria* H. 13229 (type in Pretoria and Kew Herbarium). Vogelstruispan, Waterberg, rare, 19th March, 1923, *Galpin* 607. Flats north of the Blaauwberg, fr. 24th January, 1929, *Hutchinson* 2683.

Chapter XXII

PRETORIA TOWARDS PIENAAR'S RIVER

ON Saturday, 26th January, Mr. A. D. Mogg of the Botanical Department, Division of Plant Industry, kindly took me in his car in the direction of Pienaar's River. Mr. Mogg, a keen ecologist, pointed out some very interesting plant associations on the way. Near Wonderboom Station, beyond the Magaliesberg, whose contours were now becoming almost as familiar to me as the Surrey Downs, we stopped to photograph fine examples of *Acacia hebeclada* DC. (MIMOSACEAE) (see photograph), and on a kopje near Bon Accord, 10 miles from Pretoria, there were fine examples of *Clerodendrum Rehmannii* Gürke (VERBENACEAE) (No. 2900), a shrub about 10 ft. high (see photograph, p. 399), and other plants.

Mainly due to the great assistance I received from Mr. Mogg, I made some eighty additions to my collection, and the plants gathered between Wonderboom Station and Haman's Kraal, which is as far as we went, are set out in systematic order, the distance from these two points being not more than 20 miles. They were kindly dried for me by Mr. Mogg, and were numbered after my return from Belfast, which explains why they are not in proper numerical sequence.

Collected between Wonderboom Station and Haman's Kraal, 26th January, 1929

FILICES—*Pellaea involuta* (Baker) (No. 2902).

LIGNOSAE (WOODY DICOTYLEDONS)

- SAPOTACEAE—*Mimuspops Zeyheri* Sond. (No. 2905) (see figure, p. 305).
- MIMOSACEAE—*Acacia heteracantha* Burch. (No. 2834): pairs of long white thorns; flowers white, in small globose balls. *A. stolonifera* Burch. (No. 2835): dwarf, pubescent all over; fruits woody, narrowed to each end. *A. caffra* Willd. (No. 2907): fruits glandular-puberulous. *A. hebeclada* DC. (observed, see photograph).
- PAPILIONACEAE—*Indigofera sordida* Benth. (No. 2842): leaflets about 10 pairs, hoary; flowers red. *Mundulea sericea* (Willd.) A. Chev. (No. 2885) (see p. 356). *Abrus laevigatus* E. Mey. (No. 2901): straggler; flowers white; fruits broadly oblong, thinly pubescent.
- URTICACEAE—*Pouzolzia hypoleuca* Wedd. (No. 2897): leaves ovate, 3-nerved at the base, entire, white-cobwebby below.
- CAPPARIDACEAE—*Cleome rubella* Burch. (No. 2855): small annual with 5–6 very narrow leaflets, and deep pink solitary flowers; fruits puberulous, beaked; *C. monophylla* Linn. (No. 2894): leaves simple, lanceolate; raceme with leafy bracts; flowers pale pink; fruits 7 cm. long, scabrid.
- THYMELAEACEAE—*Arthrosolen sericocephalus* Meisn. (No. 2881): stems several from a woody stock, thinly pilose; leaves linear, acute, glabrous; heads greenish-yellow, very silky.
- CUCURBITACEAE—*Coccoloba pubescens* (Sond.) (No. 2903): trailer, leaves shortly petiolate, deeply divided, verrucose, pubescent on the nerves; flowers pale primrose-yellow.
- OCHNACEAE—*Ochna pretoriensis* Phillips (No. 2875): a gnarled shrub; leaves lanceolate, very slightly crenulate; calyx enclosing the black fruit.
- COMBRETACEAE—*Combretum apiculatum* Sond. (No. 2856): leaves viscid and shining, elliptic, shortly acuminate; fruits shining, glabrous.



[Photogr. : A. O. D. Mogg, Jan. 1929.

Acacia hebeclada DC. (MIMOSACEAE), near Wonderboom Station, 6½ miles north of Pretoria.



[Photogr. A. O. D. Mogg, Jan. 1929.

Clerodendrum Rehmannii Gürke (VERBENACEAE), with the Author at Bon Accord, 10 miles north of Pretoria.

- TILIACEAE**—*Triumfetta Sonderi* Fic. & Hiern. (No. 2841) (see figure, p. 292).
Grewia flava DC. (No. 2908): leaves oblong, denticulate, softly tomentellous below.
- STERCULIACEAE**—*Hermannia Holubii* B. Davy (No. 2879): leaves broadly oblanceolate, dentate; corolla pink; stamens mauve.
- MALVACEAE**—*Abutilon austro-africanum* Hochr. (No. 2837): hoary all over with stellate hairs, flowers lemon yellow. *Hibiscus subphysaloides* Hochr. (No. 2876): leaves 3-5-lobed, thinly pubescent; flowers on long pedicels, orange-red with dark blotch.
- MALPIGHIACEAE**—*Sphegamnocarpus pruriens* (E. Mey.) Szyszl. (No. 2898): climber, leaves elliptic, small, tomentose, with medifixed hairs; fruits winged.
- AMPELIDACEAE**—*Rhoicissus erythroides* (Fres.) Pl. (No. 2896): climbing; leaflets 3, obovate-cuneate, dentate, pubescent below. *Cissus Sandersonii* Harv. (No. 2904): 5-foliolate, leaflets obovate, coarsely toothed, softly puberulous below.
- RUBIACEAE**—*Pavetta Zeyheri* Sond. (No. 2838): leaves linear-oblanceolate, glabrous; fruits fleshy, the size of a pea. *Oldenlandia Bojeri* Hiern (No. 2852): herb from a woody stock, leaves narrowly lanceolate; flowers white. *O. setifera* (No. 2873): leaves linear; flowers tinged with pink.
- VERBENACEAE**—*Clerodendrum triphyllum* (Harv.) Pears. (No. 2882): leaves in whorls of 3, linear-lanceolate, glabrous; flowers few, blue. *C. Rehmannii* Gürke (No. 2900) (see p. 399). *Vitex Zeyheri* Sond. (No. 2906): shrub; leaves 3-5-foliolate, narrowly oblanceolate, entire, tomentellous; calyx nervose. *Chascanum hederaceum* (Sond.) Moldenke (No. 2847): leaves obovate-cuneate, coarsely dentate, pubescent.

HERBACEAE (HERBACEOUS DICOTYLEDONS)

- CARYOPHYLLACEAE**—*Dianthus Zeyheri* Sond. (No. 2853): 1½ ft. high; calyx 4 cm. long; petals white.
- PORTULACACEAE**—*Portulaca collina* Dinter (No. 2914): densely stipulate herb with yellow flowers. *P. kermesina* N.E. Br. (No. 2914a): similar but with less conspicuous thread-like stipules.
- CRASSULACEAE**—*Crassula nodulosa* Schönk. (No. 2909): tufted herb, with opposite narrow leaves pectinate on the margin, and sessile axillary clusters of flowers. *C. transvaalensis* O. Ktze. (No. 2911): habit of *Lycopodium*; leaves small, lanceolate; flowers axillary, sessile.
- SAXIFRAGACEAE**—*Vahlia capensis* Thunb. (No. 2862): herb with a woody stock, densely leafy, leaves acicular; flowers yellow.
- COMPOSITAE**—*Pentzia incana* O. Ktze. (No. 2836): much-branched knarled shrublet, with small pinnate leaves and small heads of creamy white flowers.
- SOLANACEAE**—*Lycium arenicola* Miers (No. 2874): small shrub, with very short spines; leaves linear, fascicled; flowers white.
- CONVOLVULACEAE**—*Convolvulus capensis* Burm. var. *plicatus* Baker (No. 2895): trailer; leaves pinnatilobate, silky-tomentose; peduncles few-flowered.
- SCROPHULARIACEAE**—*Striga elegans* Benth. (No. 2854): corolla limb scarlet, tube yellow. *Alectra orobanchoides* Benth. (No. 2899): herb, leaves very small, flowers primrose yellow. *Craterostigma plantagineum* Hochst. (No. 2884): small herb, with broad radical Plantago-like many nerved leaves, corolla blue, edged with white.
- PEDALIACEAE**—*Pterodiscus speciosus* Hook. (No. 2913): root tuberous; leaves oblanceolate, coarsely toothed; fruits four-winged, 1.5 cm. diam.
- ACANTHACEAE**—*Barleria Virgula* C.B. Cl. (No. 2868): woody, leaves small, oblanceolate, bristle-tipped; bracts pinnate-pectinate.
- ZYGOPHYLLACEAE**—*Zygophyllum simplex* Linn. (No. 2912): small much-branched herb with small opposite succulent leaves and small white flowers.

MONOCOTYLEDONS

- COMMELINACEAE**—*Cyanotis nodiflora* Kunth. (No. 2910): flowers sky blue, in sessile axillary clusters.
- AMARYLLIDACEAE**—*Nerine laticoma* (Ker.) Dur. & Schinz. (No. 2868) (see p. 393).
- AGAVACEAE**—*Sansevieria aethiopica* Thunb. (No. 2916): leaves linear, flat, finely scabrid, margined with red.

- CYPERACEAE—*Fimbristyllis hispidula* (Vahl) Kunth (No. 2845). *Mariscus Rehmannianus* Boeck. (No. 2860). *M. Sieberianus* Nees (No. 2915): spikes about 1 cm. long. *Kyllinga alba* Nees (No. 2883): heads subglobose, nearly white, about 1.5 cm. diam. *Cyperus semitrifidus* Schönl. (No. 2886): 6–9 in. high; leaves filiform; spikelets sessile, unequal, up to 1.5 cm. long.
- GRAMINEAE—*Cymbopogon marginatus* Stapf (Nos. 2839, 2840). *Setaria lindenberglana* Stapf (No. 2839a). *Elyoneurus glaber* Phillips (No. 2843). *Trichoneura grandiglumis* Ekman (No. 2844). *Microchloa caffra* Nees (No. 2846). *Andropogon schirensis* var. *angustifolia* (Stapf) (No. 2848). *Digitaria tricholaenoides* Stapf (No. 2849). *Diplachne biflora* Hack. (No. 2850). *Eragrostis chalcantha* Trin. (No. 2851). *Digitaria monodaetyla* Stapf (No. 2857). *Aristida junciformis* Trin. et Rupr. (No. 2858). *Eragrostis lappula* var. *divaricata* Stapf (No. 2859). *Digitaria eriantha* var. *stolonifera* Stapf (No. 2863). *Aristida graciliflora* Pilger (No. 2864). *Antheophora pubescens* Nees (No. 2865). *Eragrostis barbinodis* Hack. (No. 2866). *Sporobolus nitens* Stent (Nos. 2869, 2872). *Panicum coloratum* Linn. (No. 2870). *P. maximum* Jacq. (No. 2877). *Eragrostis obtusa* Munro (No. 2871). *Digitaria tricholaenoides* Stapf (No. 2878). *Perotis indica* (Linn.) O. Kuntze (No. 2880). *Sporobolus festivus* Hochst. var. *fibrosus* Stapf (No. 2887). *Heteropogon contortus* Roem. & Schult. (No. 2888). *Aristida barbicollis* Trin. et Rupr. (No. 2889). *Pogonarthria squarrosa* Pilger (No. 2890). *Hyparrhenia dissoluta* (Steud.) C.E. Hubbard (No. 2891). *Schmidtia bulbosa* Stapf (No. 2892). *Eragrostis superba* Peyr. (No. 2893).

Chapter XXIII

PRETORIA TO BELFAST¹

A FEW days were again occupied in drying my plants and clearing the presses, and this was done with every facility at General Smuts' farm. Pretoria was visited in order to book a return passage on the *Balmoral Castle*, sailing from Cape Town on 12th April.

On the advice of General Smuts, I now prepared for a trip to Belfast, about 130 miles from Pretoria, and the highest station on the main line to Lourenço Marques. Its altitude is about 6450 ft., and it has a white population of less than 1000, and is a summer health resort.

After overhauling my plant presses at the National Herbarium on the morning of 28th January, I set off at eleven o'clock, via Erasmus



Senecio serratuloides DC. (COMPOSITAE), near the Premier Mine, Pretoria.

A, habit; B, typical leaf; C, ray-flower.

and Witbank. Near the Premier Mine² I stopped the car to collect a fine, tall, many-headed *Senecio*, *S. serratuloides* DC. (No. 2697), with linear, sharply serrate leaves and with white ray-flowers, which was growing among clumps of *Acacia*.

Near by was *Cleome diandra* Burch. (CAPPARIDACEAE) (No. 2698), a delicate herb with very narrow leaflets and short racemes of deep

¹ After leaving Belfast on my return to Pretoria and having travelled about 25 miles, I suddenly realized that one of my plant presses had disappeared. As it could not possibly have fallen out of the car, I telegraphed and wrote to the hotel, but never heard anything about it. I could only conclude that it was stolen, and this explains the blank in my numbers, mainly collected at Machadodorp.

² Also collected: No. 2693, *Dimorphotheca spectabilis* Schltr. (COMPOSITAE); 2694, *Asclepias affinis* Schltr. (ASCLEPIADACEAE); 2695, *Gladiolus Elliottii* Baker (IRIDACEAE); 2697, *Cephalaria Zeyheriana* Szabó (DIPSACACEAE).

mauve-pink flowers, the dorsal two petals with a pair of yellow blotches in the middle, and *Pelargonium Zeyheri* Harv. (GERANIACEAE) (No. 2699), the radical leaves multisect into fine segments, with umbels of dull-pink flowers.

In a broad, wet vlei by the roadside were some interesting plants,¹ including *Lobelia decipiens* Sond. (LOBELIACEAE) (No. 2701), an erect species 1–1½ ft. high, with small, linear leaves, the lower lip of the corolla blue, with two yellow blotches, the upper lip deep crimson; *Chironia transvaalensis* Gilg (GENTIANACEAE) (No. 2702), about 1 ft. high, several pairs of linear stem-leaves, and cymes of crimson flowers with spirally coiled anthers. Filling the vlei was a sedge, *Scirpus corymbosus* Roth. (No. 2706), with lateral clusters of warm brown spikelets, and, less common, a *Juncus*, *J. oxycarpus* E. Mey. (No. 2707), and *Pycreus macranthus* C.B.Cl. (CYPERACEAE) (No. 2708), with a grass, *Andropogon huillensis* Rendle (GRAMINEAE) (No. 2709).

Towards Middelburg, where I arrived at 5.30, the road lay through pleasant high veld country, densely covered with long grasses of all kinds.

Between Middelburg and Belfast the country was of much the same type, and at 3 miles² I started to collect plants, including *Nesaea sagittifolia* Koehne (LYTHRACEAE) (No. 2710), a small bush with imbricate, lanceolate, cordate-based leaves and axillary, subsessile, carmine flowers; *Gerbera discolor* Sond. (COMPOSITAE) (No. 2711), with a woolly base, discoloured, oblanceolate, radical leaves, glabrous above, woolly below.

At 5 miles³ from Middelburg conspicuous plants were *Lapeyrouisia Sandersonii* Baker (IRIDACEAE) (No. 2716), with narrow, strict leaves and a wide panicle of deep-blue flowers, and *Indigofera oxytropis* Benth. (PAPILIONACEAE) (No. 2718), a small shrublet, with short, pedunculate racemes of red flowers and short, densely hirsute fruits.

Near Arnot a conspicuous monocotyledon by the side of the railway was *Scilla rigidifolia* Baker (LILIACEAE) (No. 2719), with thick, rigid, many-nerved, lanceolate leaves and a dense raceme of small white flowers, the lowermost pedicels 5–6 cm. in length.

Between Arnot and Belfast,⁴ in open grassland, were two orchids, *Habenaria clavata* (Lindl.) Rehb. f. (No. 2720), with green, spider-like flowers, and *Disa Cooperi* Rehb. f. (No. 2722), 1–1½ ft. with a thick spike of long-spurred flowers; and two striking Asclepiads, *Asclepias macropus* Schlechter (No. 2721), stems procumbent, leaves ovate-elliptic-acute, with several spreading, looped nerves and a terminal globose cluster of flowers, the corolla green, reflexed, corona green; and

¹ Also collected: No. 2700, *Cyperus sphaerospermus* Schrad. (CYPERACEAE); 2703, *Xyris capensis* Thunb. (XYRIDACEAE); 2704, *Wahlenbergia caledonica* Sond. (CAMPANULACEAE), small blue flowers like Scotch "bluebells"; 2705, *Nidorella anomala* Steetz (COMPOSITAE).

² Also collected: No. 2712, *Hermannia transvaalensis* Schinz (STERCULIACEAE); 2713, *Hibiscus aethiopicus* Linn. (MALVACEAE); 2714, *Listia heterophylla* E. Mey. (PAPILIONACEAE).

³ Also collected: No. 2715, *Oldenlandia herbacea* Roxb. (RUBIACEAE); 2717, *Geigeria protensa* Harv. (COMPOSITAE).

⁴ Also collected: No. 2724, *Sopubia cana* Harv. (SCROPHULARIACEAE); 2725, *Helichrysum latifolium* Less. (COMPOSITAE); 2726, *Lotononis Bainesii* Baker (PAPILIONACEAE); 2727, *Hypericum Lalandii* Choisy. (HYPERICACEAE); 2728, *Delosperma Sutherlandii* N.E. Br. (FICOIDACEAE).

Pachycarpus campanulatus var. *Sutherlandii* N.E. Br. (No. 2723), stems simple, about 1 ft. high, leaves linear, the flowers four or so in a terminal umbel, very handsome and large for the family (4–5 cm. diameter), the corolla widely bell-shaped, green, the corona lobes tipped with dark purple. A pretty Papilionaceous plant was *Argyrolobium tuberosum* Eck. & Zeyh. (No. 2729), with a tuberous rootstock, trifoliolate linear leaflets, the standard yellow, but red outside, like the wings.

I arrived at Belfast about midday, and put up at the hotel. Next day (31 January) the commonage reminded me of an English meadow, and the collection I made will be best shown in systematic order. A whole season's study of the flora of this region would yield some very interesting results, as it is the highest part of the high veld.

Collected at Belfast, on the Commonage, 31st January–1st February, 1929

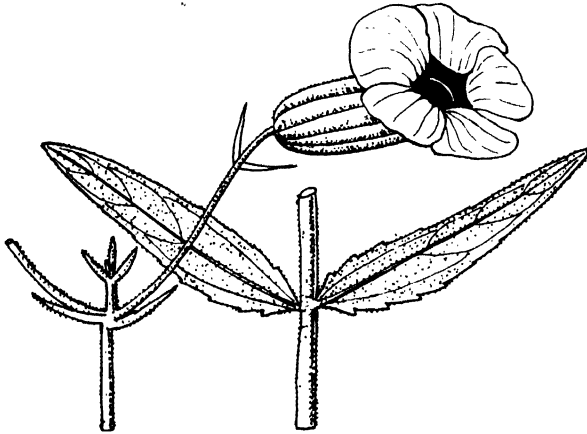
LIGNOSAE (WOODY DICOTYLEDONS)

- ROSACEAE—*Alchemilla Woodii* O. Kuntze (No. 2758): creeping; leaves small orbicular, lobulate and dentate, pilose.
- PAPILIONACEAE—*Psoralea polysticta* Benth. (No. 2746): small shrub; leaflets oblanate, gland-dotted; flowers white, faintly tinged with pale blue.
- Indigofera hedyantha* Eckl. & Zeyh. (Nos. 2747, 2749): shrublet, densely leafy; leaflets linear; flowers deep scarlet red or crimson.
- Trifolium africanum* Ser. (No. 2740): peduncles pilose; flowers bright crimson.
- RUBIACEAE—*Pentanisia prunelloides* (Sond.) Druce (No. 2743): stems hispid; leaves lanceolate; flowers lavender-blue, in a dense head.

HERBACEAE (HERBACEOUS DICOTYLEDONS)

- CARYOPHYLLACEAE—*Silene Burchellii* Otth. var. *angustifolia* Sond. (No. 2765): slender herb, corolla pink, with white corona.
- MOLLUGINACEAE—*Psammotropha myriantha* Sond. (No. 2751): densely tufted, with short linear radical leaves, and tiers of small pale green flowers.
- GENTIANACEAE—*Chironia palustris* Burch. (No. 2737): basal leaves few, linear-oblanate.
- CAMPANULACEAE—*Cyphia elata* Harv. (No. 2733): stiff herb, 1½–2 ft. high; leaves sessile, lanceolate, denticulate; flowers in a short dense spike, pale yellow.
- LOBELIACEAE—*Lobelia Erinus* Linn. (No. 2756): weak herb with linear denticulate leaves and sky blue corollas with two white spots.
- COMPOSITAE—*Helichrysum aureo-nitens* Sch. Bip. (No. 2750): herb 9 in. high, woolly all over; leaves narrowly linear-oblanate; heads golden-yellow, shining.
- H. decorum* DC. (No. 2745): herb 1½ ft.; leaves ovate-lanceolate, auriculate, woolly; heads solitary, yellow.
- Senecio peltiger* C. A. Smith (No. 2767): herb 3 ft.; leaves peltate, suborbicular, dentate; heads yellow, in a lax corymb, rayless.
- Dimorphotheca Barberiae* Harv. (No. 2730): cauline leaves remotely toothed, setulose; heads long-pedunculate; rays dull pink-mauve, disk crimson.
- CRASSULACEAE—*Crassula vaginata* Eckl. & Zeyh. (No. 2763): 1 ft. high, leaves linear, margin densely and very shortly pectinate; flowers yellow, in dense terminal cymes.
- C. sp.* (No. 2744): herb 9 in. high, with a tuft of linear-lanceolate leaves and oblanate stem leaves setulose on the surface and pectinate-ciliate; flower-buds dull red.
- UMBELLIFERAE—*Aleplea setifera* N.E. Br. (No. 2734): stem leaves numerous, narrowly lanceolate, with long setose teeth; flower-heads small, white.
- A. longifolia* E. Mey. var. *angusta* Dümmer (Nos. 2732, 2757): basal leaves oblong or elliptic, long-setose-ciliate, long-petiolate; stem leaves linear, few; heads few, white.

- SOLANACEAE—**Solanum capense** Linn. (No. 2739): stems short from a woody stock, with recurved prickles; leaves narrow, sinuate-lobate, prickly; flowers white; fruiting pedicels recurved.
- SCROPHULARIACEAE—**Melasma scabrum** Berg. (No. 2753): herb 1 ft. high with linear-lanceolate scabrid leaves and long pedicellate flowers, the corolla aureolin-yellow with deep crimson throat. **Buchnera dura** Benth. (No. 2760): leaves lanceolate, remotely denticulate, towards the base of the stem, spike short, the flowers pale crimson. **Sutera arcuata** Hieron. (No. 2748): leaves obovate, coarsely dentate, pubescent; flowers in leafy panicles, pale pink. **Nemesia capensis** (Thunb.) Kuntze (No. 2735): herb with lanky stems; leaves narrowly lanceolate, denticulate; flowers crowded at the end of a long peduncle; corolla deep pink, with two yellow humps on back lip.
- SELAGINACEAE—**Selago elata** Rolfe (No. 2766): branches hispid; leaves narrowly ovate, toothed; corymbs of small pale mauve flowers.



Melasma scabrum Berg. (SCROPHULARIACEAE), from Belfast; corolla yellow with crimson eye.

- ACANTHACEAE—**Crabbea acaulis** N.E. Br. (No. 2752): stemless; leaves in a rosette, obovate; flowers in a sessile head with tailed pectinate bracts; corolla pale mauve-white, with 2 yellow anthers.
- GERANIACEAE—**Pelargonium aconitophyllum** var. **latisectum** Knuth (No. 2764): radical leaves ovate-triangular, coarsely toothed; flowers pale pink, numerous in an umbel, calyx silky. **Geranium incanum** var. **purpureum** B. Davy (No. 2731): leaves digitately and finely dissected; flowers magenta.
- LABIATAE—**Plectranthus calycinus** Benth. (No. 2742): amongst rocks; herb 2–3 ft.; leaves ovate, closely reticulate, crenate; flowers light mauve, in axillary spike-like subsecund panicles. **Pycnostachys reticulata** Benth. (No. 2736): herb 2½ ft., leaves in whorls of 3, linear-lanceolate, denticulate; spikes of mauve flowers with reflexed subulate bracts.

MONOCOTYLEDONS

- LILIACEAE—**Aloe Ecklonis** Salm. (No. 2754): nearly 2 ft. high, with a rosette of narrowly oblong shortly toothed leaves, and almost an "umbel" of pale yellow flowers.
- AMARYLLIDACEAE—**Agapanthus pendulus** L. Bolus (No. 2768): flowers blue, pendulous on short pedicels.
- IRIDACEAE—**Gladiolus Papilio** Hook. f. (No. 2755): 2½ ft., leaves lanceolate, hood of perianth pale grey-blue, falls mottled with blue, crimson and yellow.
- ORCHIDACEAE—**Satyrion longicauda** Lindl. (No. 2738): basal leaves broadly ovate, pointed; flowering stems 1–1½ ft., densely bracteate; flowers white

tinged with carmine. (No. 2762): the same but flowers dark red. **Schizochilus Zeyheri** Schltr. (No. 2759): slender, about 1 ft., leaves cauline, linear, gradually becoming shorter upwards; flowers bright yellow, very pretty. **Disa Macowanii** Rehb. f. (No. 2761): stem leaves lanceolate, flowers in a dense narrow spike, white.

I made another collection on rocky hillsides near the dam and in vleis,¹ but unfortunately some of these were lost in the stolen press (see foot of p. 402). Among the more interesting were a beautiful orchid in the swamp, *Satyrium ocellatum* Bolus (No. 2770), 1½ ft. high, with lanceolate, amplexicaul, several-nerved leaves, and pale to deep-



Crabbea acaulis N.E. Brown (ACANTHACEAE), from Belfast; flowers mauve white.

pink flowers with long, slender spurs; an endemic species of *Epilobium*, *E. capense* Buchinger (ONAGRACEAE) (No. 2776), with crimson flowers,

¹ Also collected: No. 2769, *Crassula rubescens* Schonl. (CRASSULACEAE); 2771, *Helichrysum Galpinii* N.E. Br. (COMPOSITAE); 2773, *Wahlenbergia undulata* A.DC. (CAMPANULACEAE); 2774, *Conyza pinnata* O. Kuntze (COMPOSITAE); 2775, *Limosella maior* Diels (SCROPHULARIACEAE); 2778, *Dianthus transvaalensis* B. Davy (CARYOPHYLLACEAE); 2780, *Aster Bakerianus* B. Davy (COMPOSITAE); 2781, *Knowltonia transvaalensis* Szysz. (RANUNCULACEAE); 2782, *Kniphofia aloides* Baker (LILIACEAE); 2784, *Gladiolus Elliottii* Baker (IRIDACEAE); 2787, *Mezleria Dregeana* Sond. (LOBELIACEAE); 2790, *Habenaria Dregeana* Lindl. (ORCHIDACEAE); 2792, *Disa polygonoides* Lindl. (ORCHIDACEAE); 2793, *Lotononis mucronata* Conrath (PAPILIONACEAE); 2794, *Eriocaulon Sonderianum* (ERIOCAULACEAE); 2796, *Helichrysum* sp. (COMPOSITAE); 2797, *Periglossum angustifolium* Dcne. (ASCLEPIADACEAE); 2798, *Corycium nigrescens* Schltr. (ORCHIDACEAE); 2799, *Senecio laevigatus* var. *integrifolia* Harv. (COMPOSITAE); 2801, *Walafrida densiflora* Rolfe (SELAGINACEAE); 2802, *Buchnera dura* Benth. (SCROPHULARIACEAE); 2803, *Hermannia transvaalensis* Schinz (STERCULIACEAE); 2804, *Lopholaena segmentata* (Oliv.) S. Moore (COMPOSITAE); 2805, *Ceratostigma Schlechteri* (Kranzl.) Schltr. (ORCHIDACEAE); 2806, *Geigeria intermedia* S. Moore (COMPOSITAE); 2807, *Rhamphicarpa tubulosa* Benth. (SCROPHULARIACEAE).

the indigenous poppy, *Papaver aculeatum* Thunb. (No. 2777) (see figure, p. 205), with rich salmon-orange flowers, a dwarf *Rhus*, *R. discolor* E. Mey. (ANACARDIACEAE) (No. 2779), among rocks, with softly tomentose leaflets, a striking Liliaceous plant, *Androcymbium melanthoides* Willd. (No. 2783), also growing among rocks, with large, pale flowers striped with green; *Asclepias macropus* Schltr. (ASCLEPIADACEAE) (No. 2785) (see p. 403); *Zaluzianskya maritima* Walp. (SCROPHULARIACEAE) (No. 2786), a herb 1 ft. high, with strigose-pubescent stems, sessile oblanceolate leaves, and short spikes of flowers, crimson outside; a sky-blue-flowered *Babiana*, *B. hypogaea* Burch. (IRIDACEAE) (No. 2789); *Heben-*



Androcymbium melanthoides Willd. (LILIACEAE),
from Belfast; perianth and bracts white streaked
with green.

streitlia comosa Hochst. (SELAGINACEAE) (No. 2795), flowers white with crimson spot.

My excursion to Machadodorp and beyond nearly to Waterval Boven was cut short by the advent of heavy rain, and the plants I obtained were lost in the stolen press ¹ (see p. 402). On a hill-top I visited a memorial to fallen British soldiers.

In the evening Portuguese visitors at the hotel held an impromptu dance, this being a cool spot to which they can escape for awhile from the low, hot regions of their East African colony.

Next morning I visited Mr. Maskew's farm at Suikerboskop, and

¹ Except No. 2808, *Dimorphotheca Barberiae* Harv. (COMPOSITAE); 2809, *Manulea crassifolia* Benth. (SCROPHULARIACEAE); 2810, *Senecio isa. leus* DC. (COMPOSITAE); 2811, *Monsonia biflora* DC. (GERANIACEAE).

collected some interesting plants (all of which were subsequently stolen), including a *Protea* and *Cussonia*. The kloof scenery by the stream was very pretty, and one could camp out here in delightful surroundings.

Next morning (4th February) I left at 6.45 for Pretoria, starting off in a thick mist, with visibility of only 20 yards or so, and sometimes much less. Once I ran completely off the road and pulled up just short of some ugly rocks among the grass. I breakfasted at Middelburg at 8.30, and had a fine run in sparkling sunshine to Pretoria, arriving at 12.45, without stopping, apart from opening and closing gates. One who is accustomed to British roads must be very sweet-tempered indeed not to be annoyed by gates.

Chapter XXIV

PRETORIA TO MAFEKING AND VRYBURG

ON Wednesday, 6th February, I started off with Dr. E. P. Phillips on a tour of the west, along the south side of the Magaliesberg, assisted by a cool following easterly breeze. Three-quarters of the way to Rustenburg we paused to look at the genus *Faurea* (PROTEACEAE), growing in some quantity, but not in flower. We reached Rustenburg at 12.30, a straggling place with several tobacco factories, and proceeded to Magatas Nek,¹ where we stopped to make a collection. There were a number of interesting plants, among the more striking of which were *Psiadia arabica* Jaub. & Spach (COMPOSITAE) (No. 2918), like Golden Rod, a shrub 3 ft. high, with lanceolate pointed leaves and corymbs of golden-yellow heads; *Sutera pinnatifida* O. Kuntze (SCROPHULARIACEAE) (No. 2919), a shrublet 2 ft. high, with small, much-dissected leaves and corolla-tube pale green, the lobes dark brown. A common plant was *Kalanchoe paniculata* Harv. (CRASSULACEAE) (No. 2920), with thick stems, large, obovate, fleshy leaves and dense corymbs of pale-yellow flowers. Here again were fine examples of my own *Bridelia mollis* (EUPHORBIACEAE) (No. 2923) (see figure, p. 313), and a very pretty *Ipomoea*, *I. bathycolpos* Hall. f. (CONVOLVULACEAE) (No. 2924), on stony ground, with deeply cordate, sharply pointed leaves and pinkish-white flowers flushed with crimson inside. A small tree with silvery grey trifoliolate leaves was *Vitex Zeyheri* Sond. (VERBENACEAE) (No. 2927), now in young fruit cupped by the persistent star-shaped calyx. Among shrubs and small trees was a sweet-scented, white-flowered *Pavetta*, *P. assimilis* Sond. (RUBIACEAE) (No. 2930), a shrub 7 ft. high. It was good for a herbarium botanist, such as I, to see representatives of these tropical genera in the field. For many months when I was younger I had wrestled with the genus *Ficus*, and here was *F. Petersii* Warb. (MORACEAE) (No. 2931), waiting to greet me, a tree 30 ft. high, with small figs the size of a pea. *Jasminum breviflorum* Harv. (OLEACEAE) (No. 2933), a scrambler, with the white flowers sweet scented, as usual, was here quite common, though there are only two sheets in the Kew Herbarium, collected by Burke and by Miss O. Nation, probably at this same spot. Three species of *Rhynchosia* grew within a stone's throw of one another, *R. caribaea* DC. (PAPILIONACEAE) (No. 2935), with rhomboid leaflets and slender racemes of yellow flowers streaked with brown; *R. totta* DC. (No. 2936), with narrow leaflets and solitary flowers on long, slender pedicels; *R. densiflora* DC. (No. 2939), with softly hairy, obovate-rhomboid leaflets and dense racemes of yellow flowers. And there were two of N. E. Brown's *Indigoferas*, *I. cognata* (No. 2934), and *I. enornis* (No. 2938), which, with a bush of *Grewia caffra* Meisn.

¹ Plants also collected at Magatas Nek: No. 2917, *Rhus Gueinzii* Sond. (ANACARDIACEAE); 2921, *Aster muricatus* Less. (COMPOSITAE); 2922, *Sarcostemma viminale* R. Br. (ASCLEPIADACEAE); 2925, *Crabbea angustifolia* Nees (ACANTHACEAE); 2926, *Merremia verecunda* Rendle (CONVOLVULACEAE); 2928, *Tephrosia oblongifolia* E. Mey. (PAPILIONACEAE); 2929, *Lotononis hirsuta* Schinz (PAPILIONACEAE); 2932, *Olea verrucosa* Link (OLEACEAE).

(TILLIACEAE) (No. 2937), completed a fine batch of specimens for our presses.

Next morning we visited the Government experimental farm and saw tobacco growing in pots of different types of Transvaal soil for studying the effect on growth and quality. Several apprentices are employed for a three years' course. The main object of the station is to provide the best possible seed of cotton and tobacco for farmers.

We left at 10.15 for Zeerust, passing through bush veld country ¹ all the time, similar to the region north of Pretoria. Every now and then we encountered beautiful specimens of *Terminalia sericea* Burch., one of the loveliest small trees of the Northern Transvaal (see figure, p. 295), and here and there a kopje with stands of *Protea abyssinica* Willd. Once a donkey-cart stopped, and a Boer farmer and his wife presented us with some delicious figs, and were much interested in our activities.

By the roadside there were occasional trees, about 20 ft. high, of *Chilianthus arboreus* (L. f.) A.DC. (LOGANIACEAE) (No. 2940), with narrow leaves, hoary below, and close cymes of very small, cream flowers.

Marico is a tiny place—little more than a trading-station. We had tea at the small hotel, which cost us 6d. per cup! The road beyond Marico was much better than that of the morning, and we stopped to collect at the junction ² of the Zeerust and Rieckertsdam roads.

We reached Zeerust about 5.30, and stayed at the Marico Hotel. Next morning we left at eight o'clock, and went northwards for about 3 miles to the hills, some of them much eroded, finding among other plants ³ two species of LOGANIACEAE, one on the hillsides—*Lachnopylis suaveolens* C. A. Smith, No. 2950, at that time an undescribed species, a shrub 3–4 ft., with sweet-scented, cream flowers—the other much taller (8–10 ft.) in the dongas—*Chilianthus arboreus* (L. f.) A.DC., the sweet-scented, small, cream flowers attracting numerous moths. A pretty *Hibiscus* was *H. vitifolius* Linn. (MALVACEAE) (No. 2954), with 3–5-lobed, pilose leaves and pale-yellow flowers with a crimson blotch. We returned to Zeerust and took the Mafeking Road. On a rocky hillside just beyond Zeerust we collected a striking species of *Crotalaria*, *C. spartioides* DC. (PAPILIONACEAE) (No. 2959), which, as implied by the name, has the habit of the genus *Spartium*, a common shrub in European gardens; the vexillum is white and the wings are yellow, an unusual combination in PAPILIONACEAE.

At 30 miles I was interested to see an emblem of the folly of war in the shape of a monument to seven British soldiers who fell at Maritzani

¹ Collected between Rustenburg and Zeerust: No. 2941, *Pentarrhinum insipidum* E. Mey. (ASCLEPIADACEAE); 2942, *Sphedamnocarpus transvaalica* (O. Kuntze) B. Davy (MALPIGHIACEAE).

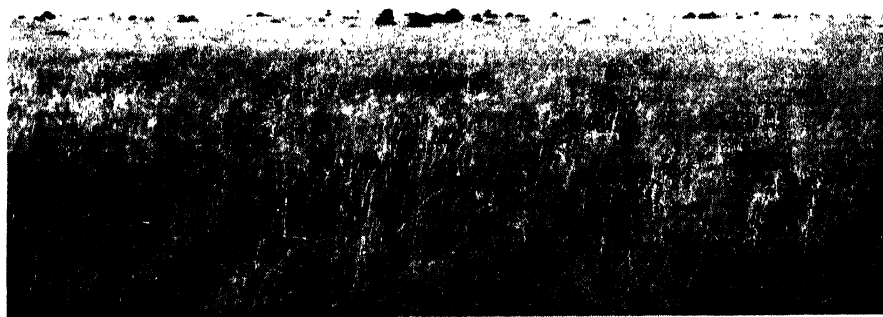
² Collected at this road junction: No. 2943, *Gomphrena decumbens* Jacq. (AMARANTACEAE); 2944, *Indigofera enormis* N.E. Br. (PAPILIONACEAE); 2945, *Aptosimum depressum* (L. f.) Burch. var. *elongatum* Hiern (SCROPHULARIACEAE); 2946, *Berkheya Rehmannii* Thell. (COMPOSITAE); 2947, *Heeria paniculosa* (E. Mey.) O. Kuntze (ANACARDIACEAE); 2948, *Sida chrysantha* Ulbrich (MALVACEAE); 2949, *Anthericum elongatum* Willd. (LILIACEAE).

³ Also collected: No. 2952, *Rhus carnosula* Schönl. (ANACARDIACEAE); 2953, *Cissus unguiformifolia* C. A. Smith (AMPELIDACEAE); 2955, *Combretum holosericeum* Sond. (COMBRETACEAE); 2957, *Gymnosporia tenuispina* Sond. (CELASTRACEAE); 2958, *Vahlia capensis* Thunb. (SAXIFRAGACEAE).



[Photogr. : I. B. Pole Evans, Sept. 1934.

Eroded country between Groot Marico and Zwarttruggens, in the Western Transvaal, with *Acacia karroo* Hayne, *A. ilakunensis* Burch. (MIMOSACEAE), and *Rhus lancea* Linn. f. (ANACARDIACEAE).



[Photogr. : I. B. Pole Evans, May 1928.

Dolomite country between Zeerust and Mafeking; the grass is mostly *Themeda triandra* Forssk. and *Cymbopogon excavatus* Stapf; the bush is composed of *Rhus lancea* Linn. f. (ANACARDIACEAE), and *Grewia cana* Sond.



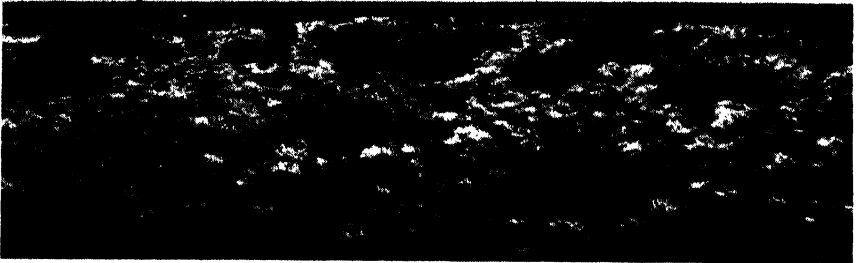
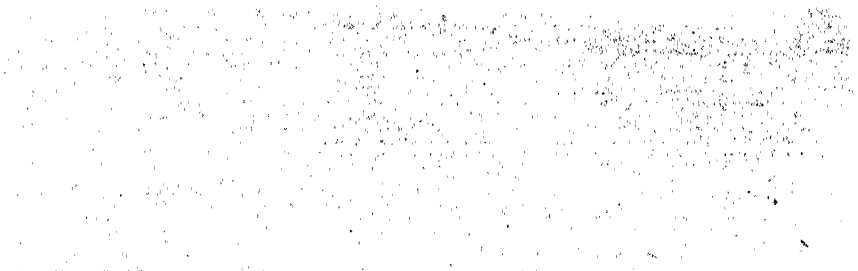
[Photogr. : I. B. Pole Evans, Apr. 1929.

Eastern Kalahari "Desert" between Mafeking and Molopo, with *Aristida* sp. (GRAMINEAE) and *Acacia Giraffae* Burch. (MIMOSACEAE).



[Photogr. : I. B. Pole Evans, Mar. 1928.

In the Kuruman Hills between Dikatlön and Kuruman, British Bechuanaland, with *Acacia Giraffae* Burch. (MIMOSACEAE), *Tarchonanthus camphoratus* Linn. (COMPOSITAE), and *Euclea lanceolata* E. Mey. (EBENACEAE); in the foreground *Aristida congesta* Roem. & Schult. (GRAMINEAE).



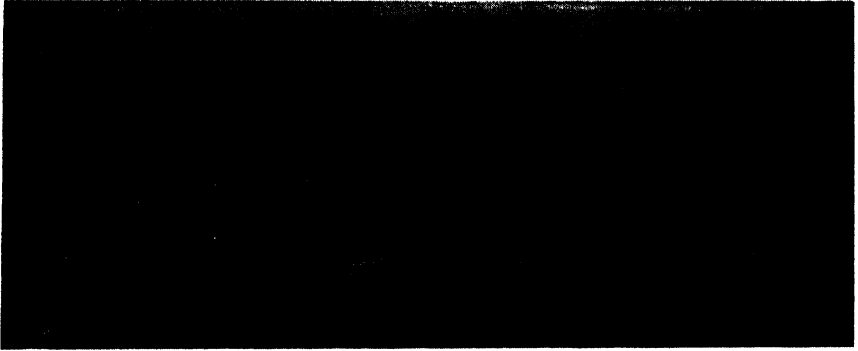
[Photogr. : I. B. Pole Evans, Apr. 1929.]

South Eastern Kalahari "Desert" between Kuruman and Oliphant's Hoek; bush composed of *Acacia haematoxylon* Willd. (MIMOSACEAE), *Tarchonanthus camphoratus* Linn. (COMPOSITAE), and *Grewia cana* with *Aristida* sp. (GRAMINEAE).



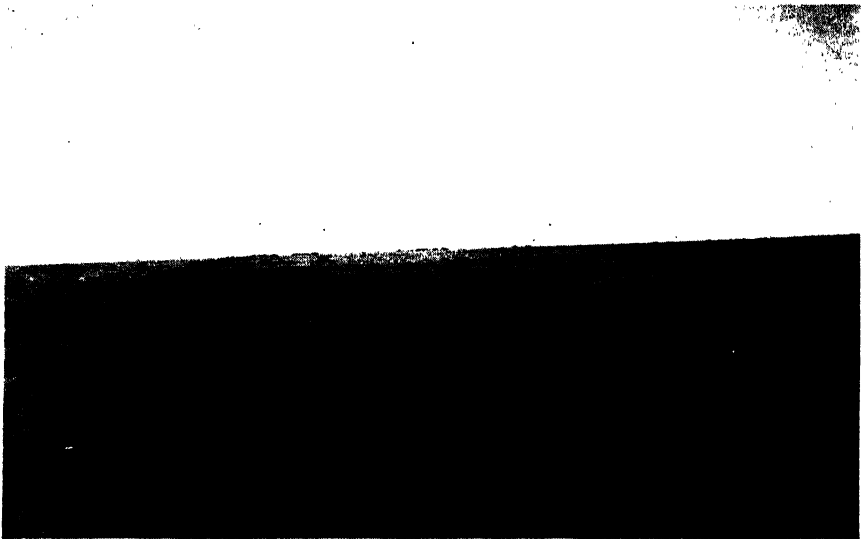
[Photogr. : I. B. Pole Evans, Mar. 1928.]

Tribulus sp. (ZYGOPHYLLACEAE), in the valley of the Kuruman River, British Bechuanaland.



[Photogr. : I. B. Pole Evans, May 1928.

“Rooi Grass”, *Themeda triandra* Forssk. (GRAMINEAE), between Mafeking and Lichtenburg; termite nest in foreground.



[Photogr. : I. B. Pole Evans, May 1928.

Featureless grass country between Mafeking and Lichtenburg; the grass is mostly *Themeda triandra* Forssk.

on 13th May, 1900. One or other of these poor fellows might have hailed from a small country village in England such as my own in Northumberland !

Between Zeerust and Mafeking we gathered only a few plants : *Cyrenium adonense* E. Mey. (SCROPHULARIACEAE) (No. 2960), a handsome species with large white flowers which persist in drying black, like others of the genus ; *Gladiolus edulis* Burch. (IRIDACEAE) (No. 2961), a slender species, the perianth whitish with a chocolate-brown stripe ; *Clematopsis Stanleyi* Hutch. (RANUNCULACEAE) (No. 2962) (see figure, p. 381), and *Monsonia biflora* DC. (GERANIACEAE) (No. 2963), 1½ ft., flowers deep mauve with darker streaks.

We reached Mafeking at one o'clock, and I was interested to visit the scene of so much excitement of my more youthful days during the Boer War. We lunched at "Granny Black's", and then proceeded north-westward for about 15 miles through attractive thin bushveld of *Acacia*, *Terminalia*, etc. There were not many plants ¹ in flower, however.

We set off next morning at 5.30, and took the road for Vryburg ; it was a marvellously beautiful morning, with a red glow in the sky, and it seemed almost as cool as a frosty September morning in England. It was a very good road, and perfectly straight for quite 45 miles to Sitagoli. I thought it must be the best road in South Africa at the time, and by then I was fairly well acquainted with them.

We passed through distinct zones of *Grewia* veld, dwarf *Rhus*, and some beautiful, quite dense stands of *Terminalia sericea*, sometimes even forming miniature forests (see figure, p. 295). It is a lovely tree, and seems to find its headquarters hereabouts. About 50 miles from Mafeking we were arrested by the sight of a fine *Brunsvigia*, *B. grandiflora* Lindl., No. 2977, and I have included a photograph by Dr. Phillips of the author digging up a specimen for growing at Kew. Breakfast was taken at Setagoli,² and a little farther on we passed a large saltpan (Kraai Pan), where the road deteriorated, but it improved towards Vryburg, which we reached at one o'clock.

In the afternoon we visited the Government experimental farm, where we spent an interesting time. The phosphorus content of the soil of many parts of South Africa is very low, and practically all over the Union cattle show "depraved appetite" or "pica".³ They eat or gnaw at bits of leather and rags, bones and carcass debris, etc. This is an indication of the lack of some essential element of food, and the animals show a special predilection for any old bleached bones which may be accessible to them, such as the remains of animals which have died on the veld. And in nearly all cases "pica" disappears if the cattle are given a liberal ration of bonemeal, which contains phosphorus. I saw for the first time the wonderful effect of feeding this bone-meal to cattle. They were hand-fed—a good tablespoonful every

¹ Collected near Mafeking : No. 2964, *Geigeria Burkei* Harv. (COMPOSITAE) ; 2965, *Blepharis capensis* Pers. (ACANTHACEAE) ; 2966, *Pituranthos aphylla* (C. & S.) Benth. & Hook. f. (UMBELLIFERAE) ; 2967, *Helichrysum nudifolium* (Linn.) Less. (COMPOSITAE).

² Collected between Setagoli and Vryburg : No. 2968, *Nerine laticoma* (Ker.) Dur. & Schinz (AMARYLLIDACEAE) ; 2969, *Rhus ciliata* Licht. (ANACARDIACEAE).

³ An account of this is given in the "Farmer's Weekly" (South Africa) for 24th and 31st December, 1924.

day—and they were twice the size of the control cattle, which I was told died too soon and upset the statistics !

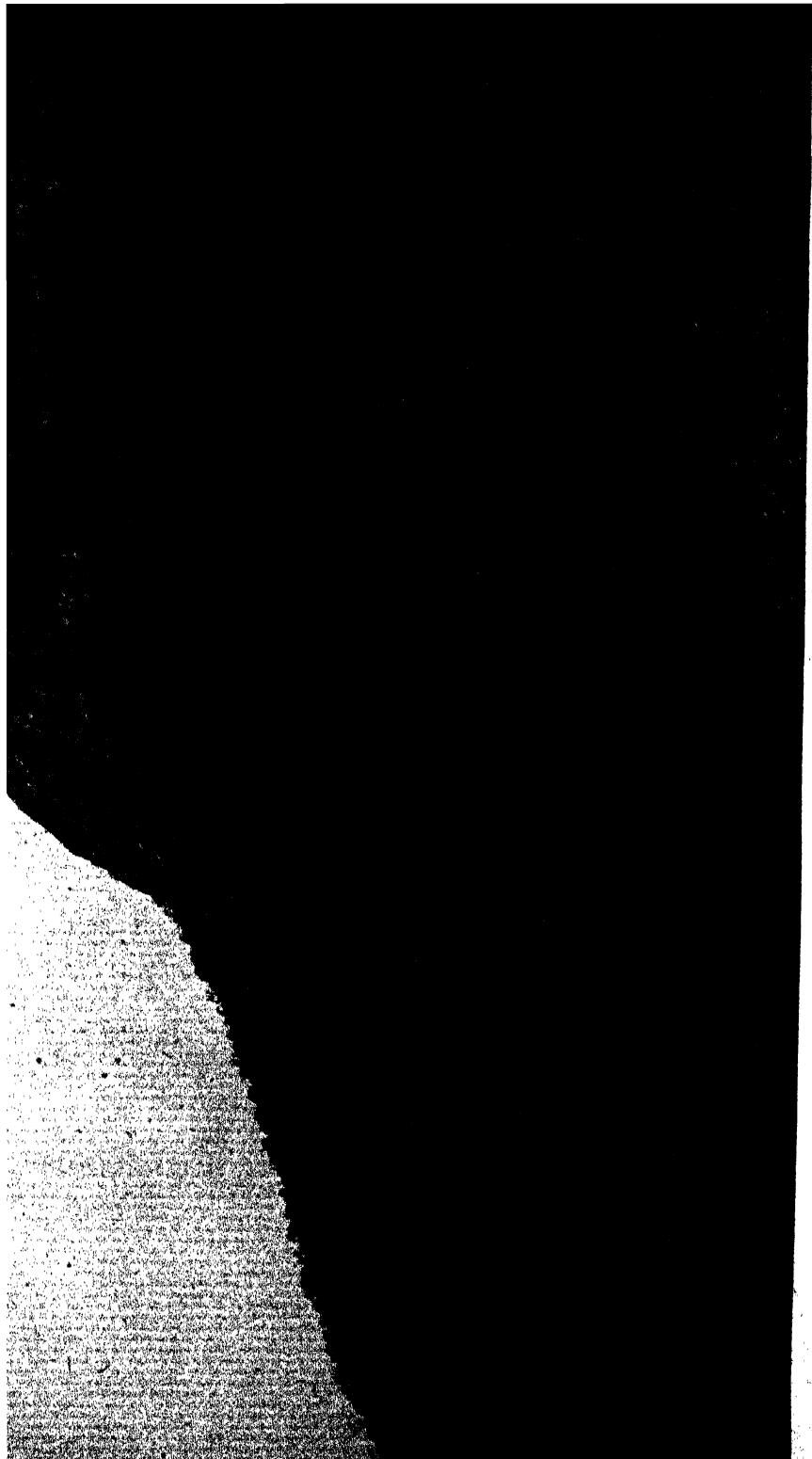
Vryburg was left behind us at 6.30 on Sunday morning (10th February), and we journeyed straight eastwards over very barren country with poor sparse grass and much *Grewia veld* (*Grewia flava* DC., No. 2971a). We collected *Harpagophytum procumbens* DC.



The Author digging up a *Brunsvigia* about 50 miles from Mafeking, on the road to Vryburg.

(PEDALIACEAE) (No. 2970) (see p. 296), and *Eragrostis obtusa* Munro (GRAMINEAE) (No. 2971).

Farther east, between Schweizer Reneke and Wolmaranstad, the country continued very flat and poor, with sparse grass. Between the latter place and Klerksdorp we collected a striking *Berkheya*, *B. onopordifolia* (DC.) B. Davy (COMPOSITAE) (No. 2973), very prickly leaves, white below, with yellow flowers; *Crotalaria griquensis* Bolus (PAPILIONACEAE) (Nos. 2972, 2975), intricately branched shrublet, with small yellow flowers turning red with age, and small globose fruits; *Rumex Ecklonianus* Meisn. (POLYGONACEAE) (No. 2974), with panicles



"The "Suikerbos", *Protea abyssinica* Willd. (PROTEACEAE), on the southern slopes of the Magaliesberg, near Commando Nek, Transvaal.
[Photogr. : I. B. Pole Evans.

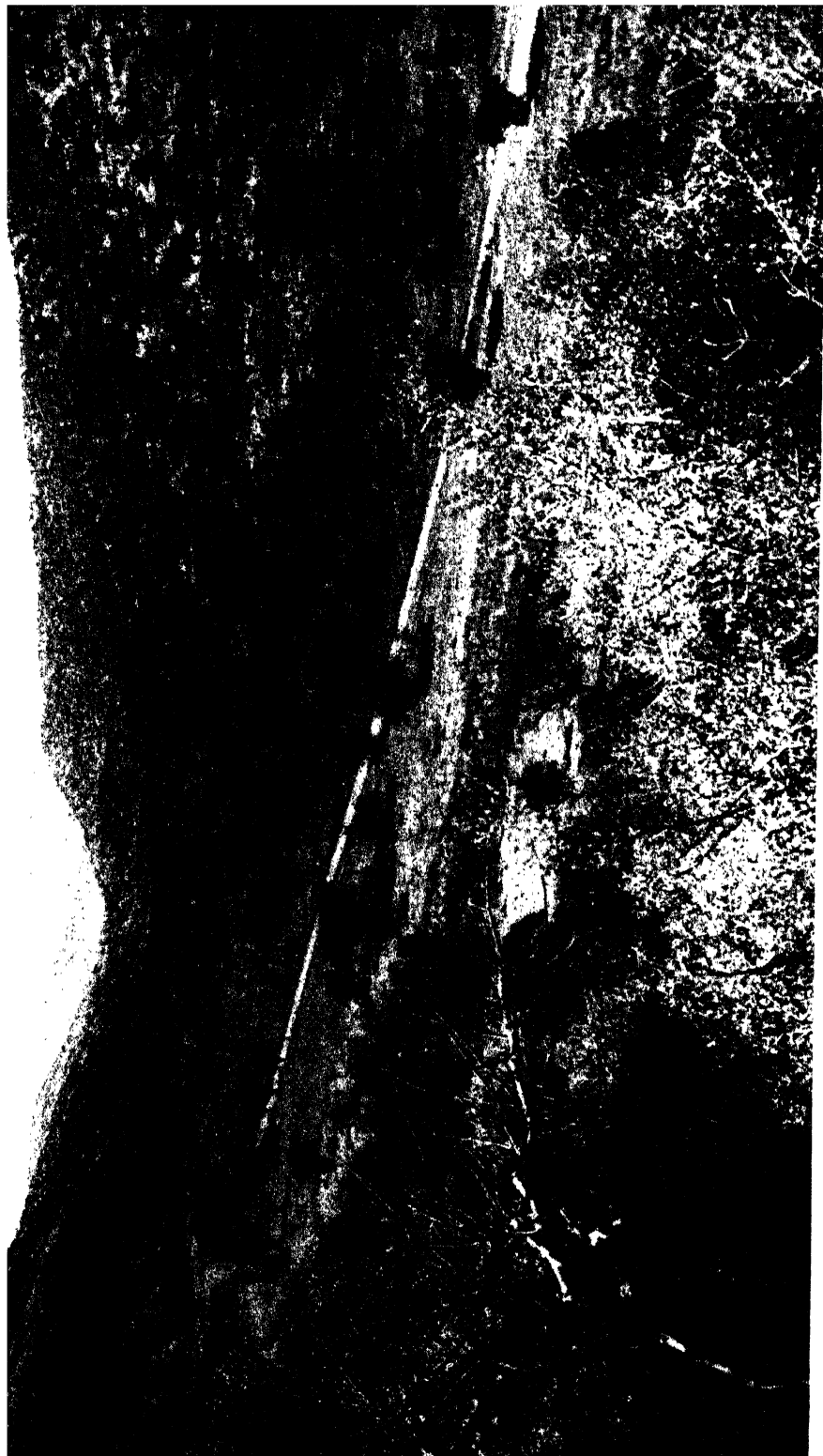


The famous "Wonderboom", *Ficus Pretoriae* B. Davy (MORACEAE), at Wonderboom Poort, eight miles north of Pretoria.
!Photogr. : I. B. Fole Ecna.



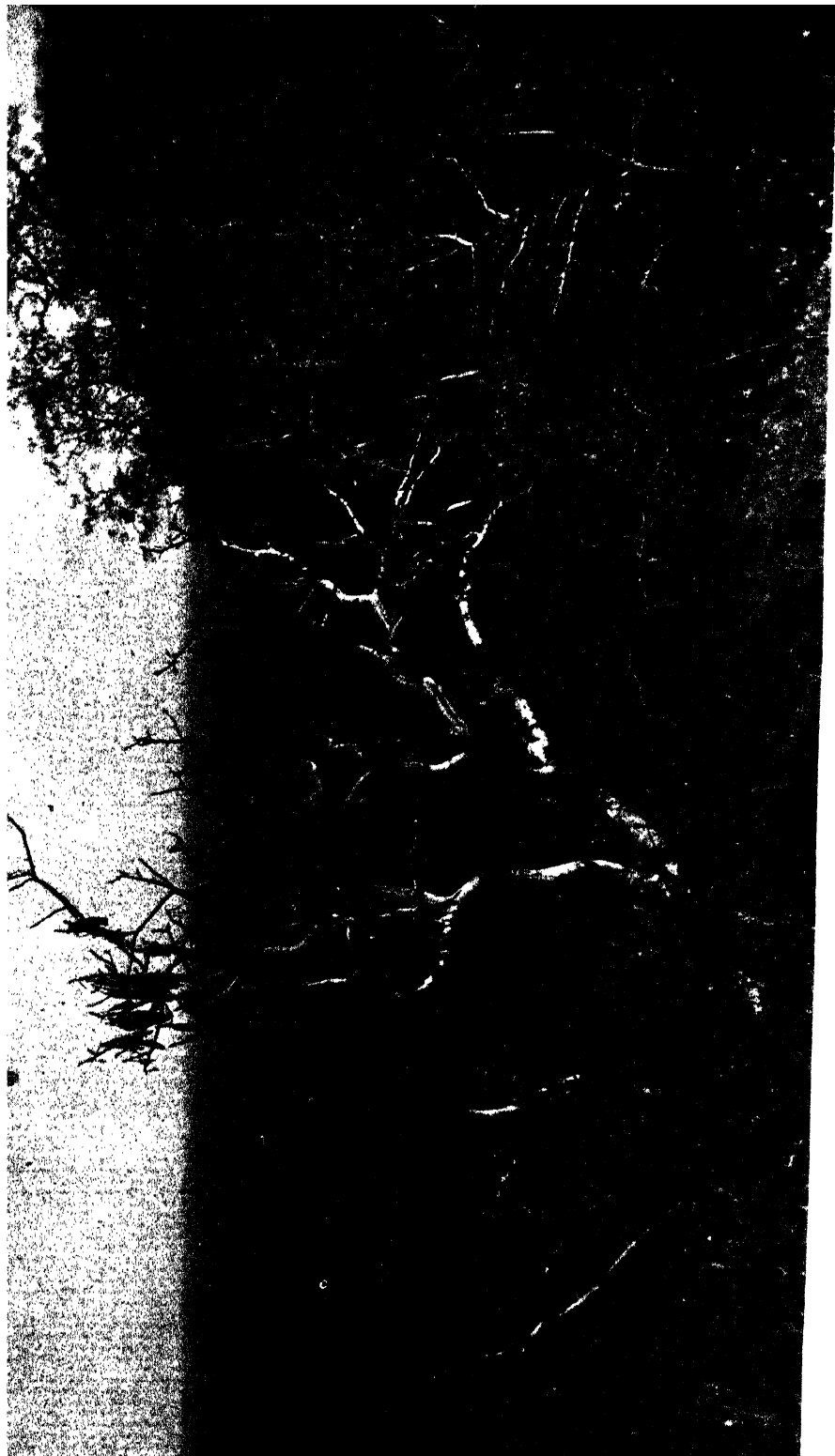
Photo: I. B. Pote Fr. ms

'Moopele' tree, *Mimusops Zeyheri* Sond (SAPOTACEAE), near Commundlo Nek, Magdalenburg, Transvaal



The Cape to Cairo road through the Waterberg, near Warmbaths, Northern Transvaal.

(Photogr. : I. B. Fole Evans.



Albizia Forbesii Benth. (MIMOSACEAE) in fruit near Warmbaths, Northern Transvaal.

(Photogr. : I. B. Pale Evans,



(Photogr.: I. B. Pole Evans,

The summer condition of the "Baobab", *Adansonia digitata* Linn. (BOMBACACEAE), near Messina, Northern Transvaal.



A giant "Baobab", *Adansonia digitata* Linn. (BOMBACACEAE), in winter, near Messina, Northern Transvaal.

Photogr. : L. B. Poole Evans.

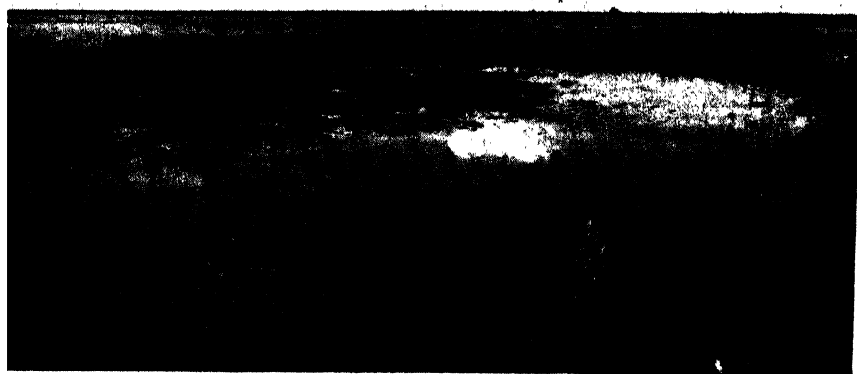


The "Tambootie", *Spirostachys africana* Sond. (EUPHORBACEAE), a highly poisonous tree, near Nylstroom, Northern Transvaal.
[*Photogr.*: I. B. Pale Evans.]



[Photogr. : I. B. Pole Evans, Mar. 1931.]

Grewia cana Sond. (TILIACEAE) and *Tarchonanthus camphoratus* Linn.
(COMPOSITAE), between Vryburg and Schweizer Reinecke.



[Photogr. : I. B. Pole Evans, Mar. 1931.]

Vlei and grass country between Schweizer Reinecke and Wolmaranstad.



[Photogr. : I. B. Pole Evans, Mar. 1931.

Between Vryburg and Schweizer Reinecke; *Acacia Giraffae* Burch. (MIMOSACEAE), and *A. stolonifera* Burch., with *Digitaria eriantha* var. *stolonifera* (GRAMINEAE).



[Photogr. : I. B. Pole Evans, Apr. 1929.

Eastern Kalahari, in the valley of the Molopo River; *Acacia Giraffae* Burch., *A. stolonifera* Burch. (MIMOSACEAE), *Tarchonanthus camphoratus* Linn. (COMPOSITAE), and *Royena pallens* Thunb. (EBENACEAE).

of greenish-yellow flowers; and *Echinochloa Holubii* Stapf (GRAMINEAE) (No. 2976), with crimson glumes.

We arrived at Klerksdorp at five o'clock—a nice town with avenues of fine trees—and here we stayed the night. Next morning saw us off at six o'clock on the road to Potchefstroom, making our breakfast in the veld by the roadside. I show a photograph of Dr. Phillips thus engaged. At Potchefstroom we visited the agricultural college, where ex-



[Photogr. by the Author, Feb. 1929.]

Dr. E. P. Phillips at breakfast between Klerksdorp and Potchefstroom.

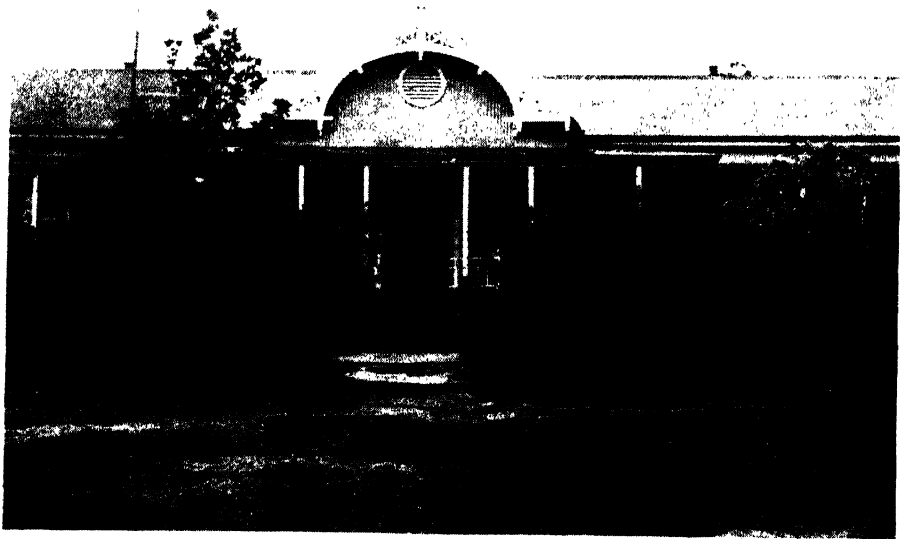
periments were being carried on in the breeding of early maturing varieties of mealies, and there were also numerous plots of different grasses.

We reached Irene in the evening, after a delightful trip under the able guidance of my companion, during which I had seen a lot of country I never expected to visit.

The next two days (12th and 13th February) were occupied in repairing the car and labelling specimens, etc. By means of a Government car, however, I was able to pay a flying visit to Onderstepoort, and was kindly shown round by Dr. DuCock. Then I was ready for my southern journey, the account of which begins in the next chapter.



A beautiful sky and "table top" mountain in the Orange Free State.



[Photogr. by the Author.]

General Smuts' home at Irene, Transvaal.

Though now eager to begin my trek back to Cape Town, I was indeed reluctant to say farewell to my kind friends at Irene, where I had made my headquarters at General Smuts' farm for several weeks. The photograph reproduced shows the front of his house at the time of my visit and is described in the following:—

General Smuts at Home

Having been a welcome and honoured guest in the General's home, I would not myself dream of withdrawing the curtain from its privacy. But it will hardly be out of place for me to quote what has already been made public by his biographer, Sarah Gertrude Millin (vol. 1, p. 264):—

“ It is a square, single-storeyed house of no particular style, painted green, with a narrow wooden verandah all the way round. It does not look a big house from the outside, but it has several enormous living-rooms and eleven bedrooms. The inside of the house is lined with wood, blue or green; . . . and practically every single thing that, during the last quarter century, has entered the house seems still to be there. At this little table children sat when they first arrived at Doornkloof, and now grandchildren sit there. This drawing-room furniture was bought from relations twenty years ago: ‘ It did not ’, says Mrs. Smuts, ‘ look well in their house. But it is all right for ours.’ Here are groups of bearded Republicans. Here are signed photographs of Royalties and Generals. Here are elephant-tusks on a stand—‘ presented ’. Here are pictures—artists’ offerings. Here are ornaments—‘ We have always had them ’. Here are just things—they are South African things. South African things are a passion.

“ . . . Nobody troubles about quality or beauty except that Smuts troubles about his books. And nobody troubles what anybody does anywhere in the house as long as nobody troubles Smuts among his books. His library is inviolate.

“ Smuts’ library has quality. It is tall and big and green-walled. Near the ceiling hang the flags he captured in German East and West Africa: the rifle and bandolier he used in the Boer war; a Bushman bow with poisoned arrows from German West; a native shield and spears; a German Imperial shield. The desk (‘ presented ’) fits a statesman. There is not a book that has no meaning.”

And so on and so on; but just one more extract, because it brings to my own mind what I saw myself, night after night when I was privileged to stay with him:—

“ The bed on the narrow verandah where he sleeps is hard, and beside it stands (to hold a lamp, a book and a cup of tea), not any sort of table, but a wooden kitchen chair. When he thinks it too luxurious for him to lie down on his hard bed, then he sits on a hard bench which runs alongside the bed. He makes his own bed.”

A few years previously he had graciously accepted a specially bound volume in red buckram (it cost me 30s. instead of the net

price of 20s. !), of my *Families of Flowering Plants*. He told me he often took it to bed with him, and its worn appearance bore this out; but I could not resist the remark that it must soon send him to sleep! I was frequently astonished at his knowledge of its contents, however, and he would discuss with me the phylogeny of the FLACOURTIACEAE, the STERCULIACEAE, the EUPHORBIACEAE, the GRAMINEAE, and many other families of flowering plants of which he has such an extensive knowledge.

Chapter XXV

PRETORIA TO KIMBERLEY, THE KAAP PLATEAU AND ASBESTOS MOUNTAINS

ON 14th February I said good-bye to my kind friends at Irene. I had been indeed fortunate to have been able to make my headquarters there for some weeks, from which I had made several excursions, and I was greatly indebted to Mrs. Smuts for all she did during that time. I had found a home from home.

My face was now definitely turned homewards again, though I had much country to see before I reached Cape Town to sail for England on 12th April. I arrived at Johannesburg at 10.15, and threaded my way through the maze of streets to the Potchefstroom road. Afterwards it was rather hilly country, but the road was pretty good, though stony in places. Vereeniging was reached at 1.30, and I put up at the hotel.

In the afternoon I called on Mr. Leslie, a correspondent of Mr. N. E. Brown at Kew, and keenly interested in succulent plants there. I saw his living collection and also a good variety of stone implements. The Vaal just here was the largest river I had seen in South Africa, its banks lined with large weeping willows; but the very muddy water did not add to its beauty.

I was off early next morning (15th February), and soon reached the Barrage, a large dam over the Vaal River. Parys came next, and then Vredefort, and I was now in the Orange Free State. Near Parys¹ I collected few plants of any particular interest, except *Notosceptrum natalense* Baker (LILIACEAE) (No. 2979), about 3 ft. high, with a dense spike of subsessile, small flowers subtended by ovate membranous bracts; as the name indicates, it occurs also in Natal, and it has rarely been collected.

I stayed the night at Bothasville, which I reached at four o'clock, after a rather anxious drive; there had been numerous gates, and everywhere the sign-posts seemed to be pointing to places not on my maps. I had to ask the way at several farms, and altogether it was a disappointing day, very hot, and no plants to collect—nothing but sandy, dried-up grass country.

The road from Bothasville to Commando Drift was very sandy, the gates seemed to be innumerable, and I was twice stuck in a sandy gateway, getting clear by jacking up the back driving-wheel and laying down a strip of carpet on the loose sand. It was hot and slow work, however, singlehanded, and I regretted being alone. During the day I must have opened and closed over a hundred gates. To add to my troubles I missed the turning for Hoopstad at the bend in the Vaal, and for several

¹ Collected near Parys: No. 2978, *Pentzia globosa* Less. (COMPOSITAE); 2980, *Geigeria Zeyheri* Harv. (COMPOSITAE); 2981, *Diclis reptans* Benth. (SCROPHULARIACEAE); 2982, *Aster muricatus* Less. (COMPOSITAE); 2983, *Trifolium africanum* Ser. (PAPILIONACEAE); 2984, *Cyperus difformis* Linn. (CYPERACEAE); 2985, *Haplocarpha scaposa* Harv. (COMPOSITAE); 2986, *Berkheya radula* (Harv.) B. Davy (COMPOSITAE).

miles followed a road which led me nowhere but towards the river. The number of gates, too, seemed to increase and the familiar notice "Mak toe de hek" on each gate, was indelibly stamped on my brain. At last, however, I met a Boer farmer, and although he could not speak English, he understood where I wanted to go, and helped me to get my bearings by drawing a diagram on the ground. I was glad to reach Hoopstad at last, nearly worn out with the heat, the gates and the flies.

At Commando Drift an attractive plant in flower was *Trichodesma angustifolium* Harv. (BORAGINACEAE) (No. 2987), with linear, minutely setulose leaves, cordate sepals and pale-blue corollas.

From Hoopstad I was much more comfortable on the main road to Bloemhof, collecting on the way specimens of *Acacia Giraffae* Burchell (MIMOSACEAE) (No. 2988) and *Pentzia incana* O. Kuntze (COMPOSITAE) (No. 2989). I crossed the Vaal by a good pont (2s. 6d.), in company with a Boer farmer and his horse, the latter sorely pestered by flies. From Bloemhof I went at an easy pace to Christiana, arriving there at twelve o'clock. Here there were many nice shady avenues, due to irrigation from the Vaal river. It was so hot (98° F. in the shade) that I was compelled to rest during the afternoon. At dinner that evening I met a Wesleyan missionary from Ealing, only 3 miles or so from Kew!

At Christiana I again crossed the Vaal by pont (3s. 6d. this time, and a sleepy affair), the bridge not being completed. The Vaal is a fine stream here, but muddy, as before. I made off in the direction of Warrenton, inquiring the way of a diamond-digger, a well-educated, youngish man of Danish origin, who insisted that I should stay for awhile in his shack and share a tin of peaches. I was much interested to see his crude method of working, and he showed me two diamonds worth about £30, which he had obtained the week before. He offered to buy my car, but I had not quite finished with it! I passed through Warrenton, on the railway, at 2.15, collecting between there and Kimberley *Nerine laticoma* (Ker) Dur. & Schinz (AMARYLLIDACEAE) (No. 2991), the whole veld being pink with this plant, which was dominant for a time, and a very fine sight. I called at once on Miss Wilman at the Macgregor Museum, Kimberley. Under her guidance I inspected the Museum and the Succulent Garden, which she has done so much to establish.

Next morning Mr. Powell, a local teacher and botanist, went with me to a low kopje a few miles south west of the town, and we collected the only few plants in flower. These were: *Kalanchoe paniculata* Harv. (CRASSULACEAE) (No. 2993), about 1½ ft. high, leaves obovate, glabrous; flowers yellow, in a lax corymbose panicle; *Sutera battlapina* Hiern (SCROPHULARIACEAE) (No. 2994), woody and laxly branched, leaves spatulate, dentate to trilobed, glabrous; *Enneapogon scoparius* Stapf (GRAMINEAE) (No. 2995), a short, wiry, tufted grass with short spikes on slender peduncles; *Barleria rigida* Nees (ACANTHACEAE) (No. 2996) (see p. 430); *Euphorbia rectirama* N.E. Br. (EUPHORBIACEAE) (No. 2997), a leafless, divaricately branched shrub in fruit; *Crotalaria griquensis* Bolus (PAPILIONACEAE) (No. 2998), a much-branched shrub with spine-tipped branchlets, trifoliolate leaves, and subsolitary, yellowish flowers; *Aptosimum Marlothii* (Engl.) Hiern (SCROPHULARIACEAE) (No. 2999), a small shrub with arrested lateral branchlets bearing tufts of small, narrow leaves, and with solitary pale mauve flowers,



Acacia Giraffae Burchell (MIMOSACEAE), on the Kaap Plateau.

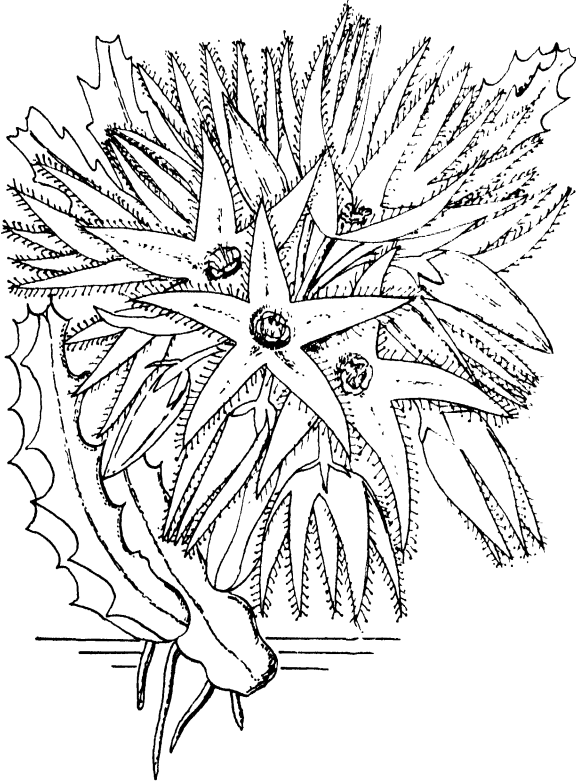


[Photogrs. by the Author.]

A South African Olive, *Olea verrucosa* Link (OLEACEAE), on the Kaap Plateau.

the corolla abruptly contracted towards the base; *Lightfootia tenella* DC. (CAMPANULACEAE) (No. 3000), with fascicles of very small, dry, hard leaves and very small corymbs of pale-mauve flowers.

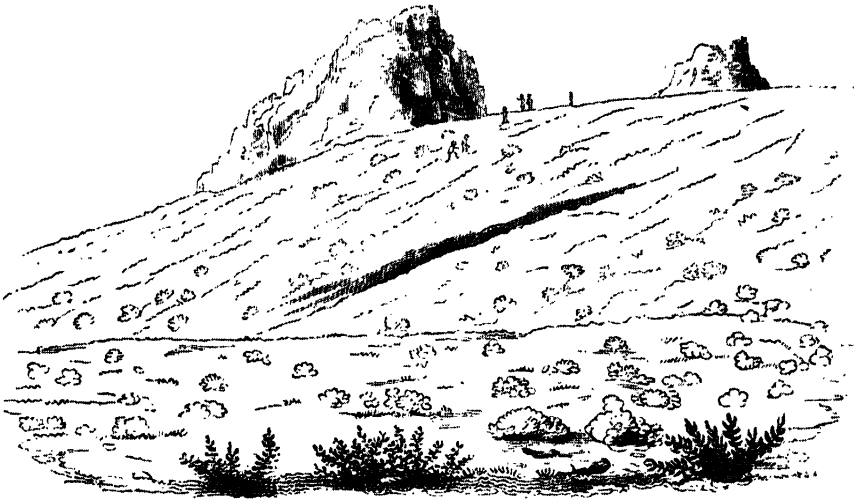
An evening was spent viewing Mr. Cronin's very fine photographic studies of natives and native life. Next morning Miss Wilman kindly accompanied me to see the De Beers Diamond Mine. It was intensely interesting to see the Pulsator working from which diamonds worth about £1500 are sifted every day.



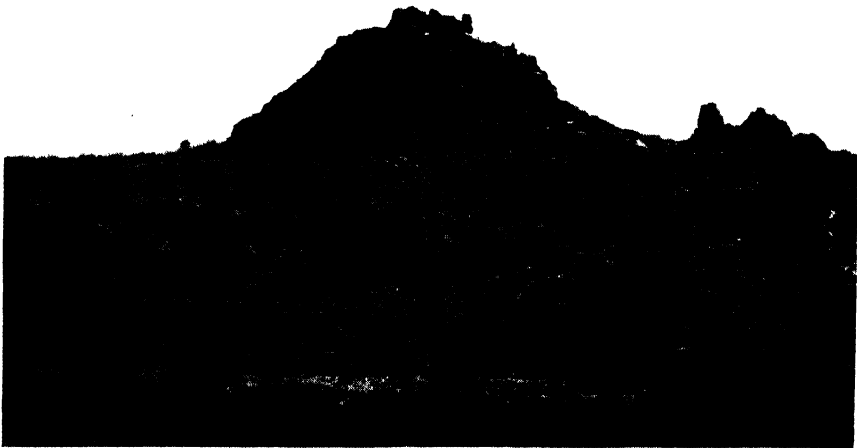
Caralluma lutea N.E. Br. (ASCLEPIADACEAE), from near Blinkklip, Postmasberg; flowers yellow, evil smelling.—After Hook. Ic. Pl.

In the afternoon we drove to the farm of Mr. Tapscott, one of a South African family well known in the annals of international lawn tennis, and keen on succulent plants. Owing to the heat, I was glad of a swim in the Vaal alongside the house.

On the return to Kimberley we stopped to collect a remarkable Asclepiad with long trailing stems among the grass, some of the stems being several yards in length. This proved to be *Orthanthera jasminiflora* (Decne) N.E. Br. (No. 2992), with oblong-lanceolate, scabrid leaves, rounded-cordate at the base, and umbels of tubular white flowers, greenish outside. The species has a fairly wide range in sub-tropical southern Africa.



Burchell's sketch of Blinkklip, on the Kaap Plateau.



[Photogr. by the Author.]

Photograph of the same place in 1929.

On Thursday, 21st February, Mr. Tapscott went with me for a short tour across the weird Kaap Plateau, to the west, and of the Asbestos mountains, which I was eager to see because of Burchell having passed through that way. At Baviaans Krantz we found a few flowering plants: *Lebeckia psiloloba* (E. Mey.) Walp. (PAPILIONACEAE) (No. 3001), much branched and with very sharp, spine-tipped branchlets, in fruit—these thin and glabrous, and 3.5 cm. long; *Osteospermum leptolobum* (Harv.) Nordl. (COMPOSITAE) (No. 3002), leaves trifid; heads very small, subsessile, yellow; *Acacia heteracantha* Burch. (MIMOSACEAE) (No. 3003), a tree 15 ft.; leaflets softly pubescent; fruits torulose and spirally twisted; *Celtis Kraussiana* Bernh. (ULMACEAE) (No. 3003a), a tree 30 ft., against cliffs, with ovate, 3-nerved, pubescent leaves; and *Solanum Burchellii* Dun. (SOLANACEAE) (No. 3004), leaves small, oblong-elliptic, closely tomentellous; fruits 1 cm. diameter, shining.

Near Papkuil were *Lobelia thermalis* Thunb. (LOBELIACEAE) (No. 3005), procumbent; stems setose-pilose; leaves oblanceolate, dentate; flowers pale blue; *Walafrida saxatilis* Rolfe (SELAGINACEAE) (No. 3006), woody and much branched from the base, and 6 ins. high, with fascicles of tiny leaves and narrow inflorescences of small flowers; and *Pentzia spinescens* Less. (COMPOSITAE) (No. 3007), leaves small, pinnatifid, woolly; heads yellow, shortly pedunculate.

On the hills between Papkuil and Postmasburg, and scattered here and there, were trees, 15–20 ft. high, of an olive, *Olea verrucosa* Link (OLEACEAE) (No. 3009), and they seemed to occur over the whole plateau; and a *Rhus* was very common everywhere on the plateau, *R. ciliata* Linn. (ANACARDIACEAE) (No. 3100), with narrow leaflets sharply mucronate, and small panicles of flowers, growing in association with *Tarchonanthus camphoratus* L. (COMPOSITAE). Herbs were represented by *Gazania oxyleoba* DC. (COMPOSITAE) (No. 3011), a small plant with linear leaves white-woolly below, and shortly pedunculate flower-heads; *Geigeria passerinoides* Harv. (COMPOSITAE) (No. 3012), leaves linear, pubescent, older heads persistent and crowded at the base of the shoots; *Hermannia comosa* Burch. (STERCULIACEAE) (No. 3013), with bladder-like calyces and crimson corollas, and *Nenax microphylla* Sond. (RUBIACEAE) (No. 3014), a shrublet with clusters of sessile fruits.

On hills running east of and parallel¹ with the Asbestos Mountains I added a few plants to my presses. On approaching Postmasburg we deviated in order to see Blinkklip, a remarkable cave visited and described by Burchell. We photographed the cave and collected some examples of the soft, black, shining rock, and I reproduce our photograph with one of Burchell's sketches of the locality for comparison. Natives from miles around used to come to this cave in order to obtain the rock for ornamenting their bodies.

Near Blinkklip were two Asclepiads: *Xysmalobium ensifolium* Burchell (No. 3022), local to this part of South Africa, with pale green flowers in lateral umbels, and *Caralluma lutea* N.E. Br. (No. 3023), stems

¹ Collected on hills parallel with Asbestos Mountains: No. 3015, *Pentzia sphaerocephala* DC. (COMPOSITAE); 3016, *Aster muricatus* Less. (COMPOSITAE); 3017, *Walafrida densiflora* Rolfe (SELAGINACEAE); 3018, *Indigofera alternans* DC. (PAPILIONACEAE); 3019, *Peliostomum leucorrhizum* E. Mey. (SCROPHULARIACEAE); 3020, *Trochomeria debilis* Hk. f. (CUCURBITACEAE); 3021, *Chrysocoma tenuifolia* Berg. (COMPOSITAE).



Burchell's cave at Blinkklip.



[Photogr. by the Author.]

A close-up of the same cave.

rooting at the nodes, sharply toothed; flowers yellow, in a bunch, evil-smelling; and *Nymannia capensis* (MELIACEAE) (No. 3024), which puzzled me in the field as to its family (see p. 63).

We stayed the night at Postmasburg,¹ and in the evening botanised around the village, the more striking plants found being *Lasiocorys capensis* Burch. (LABIATAE) (No. 3028), a hoary, low shrublet with hook-tipped, entire leaves and sessile, solitary white flowers; *Ornithoglossum glaucum* Salisb. (LILIACEAE) (No. 3033), a small herb with recurved pedicels, few narrow leaves, and linear, pale-green perianth-segments; and *Crassula lycopodioides* Lam. (CRASSULACEAE) (No. 3036), with long, whip-like branches.

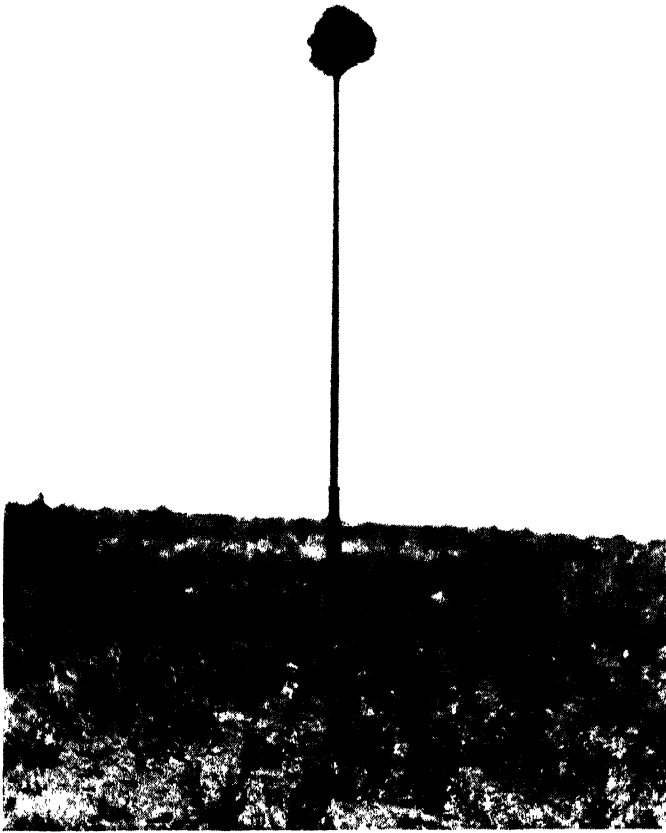
Next day (23rd February) we continued our tour of the plateau, via Griquatown, collecting on the way *Lebeckia psiloloba* (E. Mey.) Walp. (PAPILIONACEAE) (No. 3039), leafless and with sharp, spine-tipped branchlets protecting the yellow flowers, and a remarkable-looking plant, *Cadaba termitaria* (CAPPARIDACEAE) (No. 3040), which puzzled me in the field as to what it might be; it was a shrub 4-5 ft. high, with clusters of flowers on glandular pedicels, a long androgynophore, and slender, subtulose fruits; this has since been figured in the *Flowering Plants of South Africa*, t. 556.

The Asbestos Mountains were disappointingly low and excessively dry at this season. But Griquatown was a pleasing sight, with beautifully green trees in the streets contrasting sharply with the arid country round about. I bought a brightly coloured Kaffir blanket as a keepsake, and we proceeded to Wittewater, on Burchell's route, arriving after lunch. The accompanying photograph is that of a Society-bird's nest on a telegraph pole by the wayside.

Around Wittewater we found only about a dozen plants in flower, which was disappointing, for Burchell collected many more in this region. The veld was very dry and over-stocked. The local store sheltered us for the night, and I was interested to watch the arrival of a Boer wagon, which outspanned at 8.15, with eighteen donkeys, a Boer and his wife, two daughters and a baby. Petrol here was 3s. per gallon. We collected the following at Wittewater: *Aptosimum nanum* Engl. (SCROPHULARIACEAE) (No. 3041); *Barleria rigida* Nees (ACANTHACEAE), the *locus classicus* for this species collected near here by Burchell (No. 3042); *Eriocephalus ericoides* (L.) Druce, No. 3043; *Hermannia comosa* Burch. (STERCULIACEAE) (No. 3044); *Chrysocoma tenuifolia* Berg. (COMPOSITAE) (No. 3045); *Geigeria passerinoides* Harv. (COMPOSITAE) (No. 3046); *Sutera halimifolia* (Benth.) O. Kuntze (SCROPHULARIACEAE) (No. 3047); *Lycium tetrandrum* Thunb. (SOLANACEAE) (No. 3048); *Pentzia lanata* Hutch. (COMPOSITAE) (No. 3049); *Lasiocorys capensis* Burch. (LABIATAE) (No. 3050); *Sutera atropurpurea* Hiern (SCROPHULARIACEAE) (No. 3051); *Heliotropium lineare* C.H. Wright (BORAGINACEAE) (No. 3052); *Oligomeris pachyrrhiza* C.A. Smith (RESEDACEAE) (No. 3053).

¹ Also collected: 3025, *Asclepias Burchellii* Schltr. (ASCLEPIADACEAE); 3026, *Euphorbia gariiepina* Boiss. (EUPHORBIACEAE); 3027, *Senecio radicans* DC. (COMPOSITAE); 3029, *Hermbsstaedtia elegans* Moq. (AMARANTACEAE); 3030, *Senecio reptans* Turcz. (COMPOSITAE); 3031, *Peliostomum origanoides* Eckl. & Zeyh. (SCROPHULARIACEAE); 3032, *Oligomeris capensis* Thunb. (RESEDACEAE); 3034, *Anihericum elongatum* Willd. (LILIACEAE); 3035, *Euphorbia* sp. (too poor for determination); 3037, *Huernia* sp.; 3038, *Caralluma* sp. (ASCLEPIADACEAE).

We left Wittewater the next morning (Sunday, 24th February) at 8.30, and soon reached Griquatown and proceeded on the road to Campbell, arriving there at eleven o'clock; the road was a bad one and very dusty. In a kloof near Campbell we collected a large-flowered Asclepiad with dull red, very hairy flowers—*Stapelia flavirostris* N.E. Br. (No. 3054). We travelled by a road parallel with the edge of the



Society-bird's nest at the top of a telegraph pole between Griquatown and Wittewater.

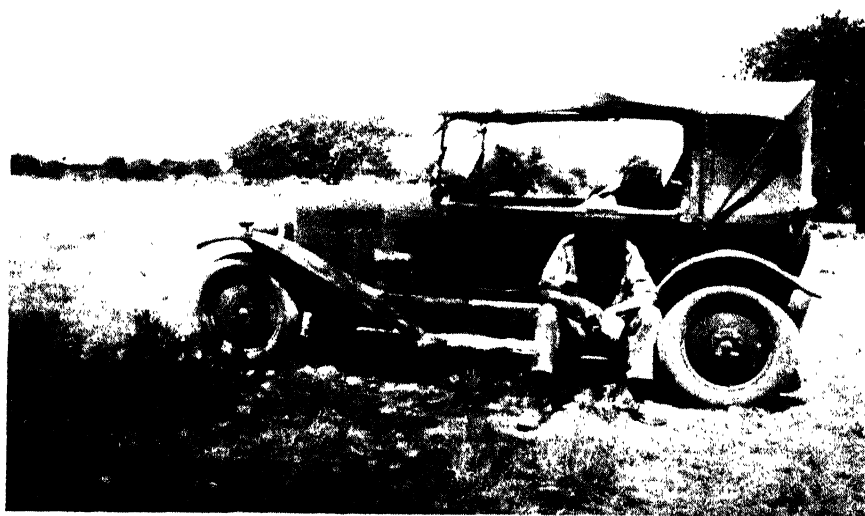
plateau to Smits Drift, where we picnicked under an Acacia. Mr. Tapscott took a photograph of me sitting on the car, which I reproduce, not so much to show myself, but the little car which served me so well. It was so hot here that a sandwich I laid on the running-board whilst I collected a specimen became as crisp as toast in a few minutes!

We reached Kimberley at 3.15, after an interesting trip over strange and, from a botanical point of view, rather desolate country.



Kloof, near Campbell.

(Photogr. by the Author.)



(Photogr. by W. Tapscott.)

The Author and his little car on the Kaap Plateau.

Chapter XXVI

FROM KIMBERLEY VIA GRAAFF REINET AND MEIRINGS POORT TO CAPE TOWN

FROM Kimberley on Tuesday, 26th February, I journeyed in a day to Bloemfontein, but there were no plants of interest to collect. Here and there I noted *Acacia stolonifera* Burch. to be dominant over a considerable part of the veld, and the grass was very short and much eaten. I reached Boshof by ten o'clock by a good road, which continued so to Dealsville, except for several gates, and thence was first class to Bloemfontein, where I arrived at 2.30.

On Wednesday, 27th February, I called on Professor George Potts at University College. After showing me the college, he kindly accompanied me to the public gardens to meet the Curator, Mr. A. F. Baker (at Kew 1918-1920), who, like Mr. Long at Port Elizabeth, had made the public gardens a notable feature of the town. The baths were the most beautiful I had seen in South Africa, encircled by fine green lawns and flower-beds, some of which reminded me of portions of the Chelsea Flower Show.

At Bloemfontein Dr. E. P. Phillips joined me once more, and continued with me to the Fauresmith Reserve and as far as Rosemead Junction. As Mr. Dyer joined me at Fauresmith, I was again well provided with congenial companion botanists, and Mr. Dyer remained with me until our mishap in Meirings Poort (see p. 443).

On Thursday, 28th February, Dr. Phillips and I started at nine o'clock on the road south to Edenburg. The road by the railway was in a terrible state, and I was compelled to give all my attention to driving. In consequence I was scarcely aware when we passed from the High Veld to the Karoo, which occurs about here. On a hill between Kaffir and Edenburg, with scattered trees of *Olea verrucosa*, however, we collected an *Indigofera*, *I. argyraea* Eckl. & Zeyh. (PAPILIONACEAE) (No. 3055), prostrate from a woody stock, with small, silvery, trifoliate leaves and very short racemes of crimson flowers; but nothing further was gathered until we reached the Fauresmith Reserve, where we arrived in the late afternoon, the road via Jagersfontein becoming fairly good.

Fauresmith is quite a pleasant place, and has a quaint aspect, because the railway runs along the middle of the main street, where Mr. Dyer stepped out of the train shortly after our arrival.

I made a small collection of the few plants in flower at the Fauresmith Botanical Reserve,¹ where besides purely botanical research, experimental work with fodder plants likely to be suitable to this region of the Great Karoo is carried on. The Reserve is right in the heart of

¹ Also collected: No. 3056, *Mesembryanthemum* sp. (FICOIDACEAE); 3058, *Geigeria passerinoides* Harv. (COMPOSITAE); 3059, *Indigofera alternans* DC. (PAPILIONACEAE); 3061, *Monsonia Burkeana* Pl. (GERANIACEAE); 3063, *Solanum capense* var. *tomentosa* C.H. Wright; 3064, *Sutera pinnatifida* (Benth.) O. Ktze. (SCROPHULARIACEAE); 3065, *Stachys rugosa* Ait. var. *linearis* Skan (LABIATAE); 3066, *Euryops sulcatus* Less. (COMPOSITAE); 3067, *Pegolettia polygalaeifolia* Less. (COMPOSITAE).

a large area which is neither high veld nor Karoo, but a mixture of both, and mostly of the latter. Among the plants collected were *Chilianthus arboreus* (Linn. f.) A.DC. (LOGANIACEAE) (No. 3057), a shrub 3-4 ft., with scurfy, narrowly lanceolate leaves and small dense panicles of cream flowers; *Pentzia quinquefolia* (Thunb.) Less. (COMPOSITAE) (No. 3060), a small shrub with small, fan-shaped, dentate, shortly pubescent leaves, and long-pedunculate, yellow flower-heads; *Lessertia benguellensis* Bak. f. (PAPILIONACEAE) (No. 3052), with pinnate leaves and linear leaflets, and membranous, bladder-like fruits about 3-4 cm. long; and *Rhus ciliata* Licht. (ANACARDIACEAE) (No. 3068), a shrub with divaricate branchlets, winged petioles, narrow, slightly pubescent leaflets and panicles of greenish yellow flowers.

Sunday, 3rd March, was a motoring day, and proved somewhat eventful. We started from Fauresmith at seven o'clock, on a fair road for Philippolis because it was good, hard veld, and not made up with loose, soft soil. We breakfasted at Philippolis, and wandered around the town, everyone turning out to go to church. We proceeded on a good road towards Colesberg,¹ about six miles from which the radiator of our much-overloaded car burst near the main-supply pipe, and I had to proceed by very short stages to the town, in case the engine seized up.

As the garages were closed we sought rooms at the hotel, which, however, was full. Fortunately a garage proprietor turned up at length, and after lunch obligingly soldered up the hole in the pipe. We were thus able to continue to Naauppoort Junction, for there was little to collect hereabouts at this season. The junction, like most other railway centres, was smoky and dirty, but there are fine mountains surrounding the town, which in the evening were beautifully silhouetted against the setting sun. The wind was then cold, and a cheerless hotel sent us early to bed.

Next morning we were soon off, and drove quietly to the foot of the Kivorsch mountains alongside the railway. We were about to climb over the fence when a tall farmer galloped up to say good morning and to ask our business. From the looks he gave us we might have been either illicit diamond collectors or brigands. After some talk, however, he rather grudgingly gave consent for us to cross his land to climb the table-like mountain about 1000 feet or so above the general level. The plants collected, mostly on top, are worth enumerating in systematic order:—

Collected in the Kivorsch Mountains, 4th March

LIGNOSAE (WOODY DICOTYLEDONS)

PAPILIONACEAE—*Lotononis divaricata* Benth. (No. 3090): shrub 3 ft., flowers blue and white.

RHAMNACEAE—*Rhamnus prinoides* L'Herit. (No. 3072): tree 12 ft.; leaves elliptic, crenulate; flowers small, axillary, green.

¹ Collected near Colesberg: No. 3069, *Pterothrix spinescens* DC. (COMPOSITAE); 3070, *Aptosimum depressum* Burch. (SCROPHULARIACEAE); 3138, *Blepharis villosa* C.B. Clarke (ACANTHACEAE); 3139, *Gnaphalium micranthum* Thunb. (COMPOSITAE); 3140, *Ornithogalum glaucum* Salisb. (LILIACEAE); 3141, 3142, *Peliostomum organoides* E. Mey. (SCROPHULARIACEAE); 3143, *Indigofera alternans* DC. (PAPILIONACEAE); 3144, *Peliostomum leucorrhizum* E. Mey.

ANACARDIACEAE—**Rhus Dregeana** *Sond.* (No. 3075): on western slopes; leaflets linear, entire, glabrous; flowers very small in graceful panicles. **R. erosa** *Thunb.* (No. 3086): shrub 3–6 ft.; leaflets linear, widely dentate; panicles very small. **R. mucronata** *Thunb.* (No. 3074): on southern slopes; leaflets narrowly obovate, entire; fruits small and shining.

ASCLEPIADACEAE—**Xysmalobium gomphocarpoides** *Dietr.* (No. 3097): leaves linear-lanceolate, with very strongly undulate margins; flowers greenish-mauve.

RUBIACEAE—**Anthospermum tricostatum** *Sond.* (No. 3073): much-branched shrublet with puberulous branches, and clusters of small leaves and flowers.

HERBACEAE (HERBACEOUS DICOTYLEDONS)

UMBELLIFERAE—**Pituranthos aphylla** (*C. & S.*) *Benth. & Hook. f.* (No. 3092): leaves reduced to scales; flowers yellow, in compound ebracteate umbels.

CAMPANULACEAE—**Lightfootia tenella** *A. DC.* (No. 3079): much-branched shrublet; leaves acicular, fasciculate; flowers pale yellow, subcorymbose.

COMPOSITAE—**Chrysocoma tenuifolia** *Berg.* (No. 3081). **Pegolettia polygali-folia** *Less.* (No. 3084): leaves very small, obovate-spathulate, densely glandular-punctate; heads rayless, pale yellow, pappus subplumose. **Elytropappus Rhinocerotis** *Less.* (No. 3087) (see p. 446). **Helichrysum niveum** *Less.* (No. 3078): woody; leaves narrowly spathulate-oblancoolate, felted; heads yellow, in a small dense cluster. **Pentzia punctata** *Harr.* (No. 3085): shrub 3 ft.; leaves much divided, glandular punctate; heads very small, corymbose. **P. globosa** *Less.* (No. 3080): small intricately branched shrublet with woolly branchlets and very small pinnatifid leaves; heads solitary, small. **Senecio glutinosus** *Thunb.* (No. 3071): herb nearly 1 ft. high; leaves oblanceolate, irregularly toothed, setulose-pubescent; rays pale yellow. **Euryops racemosus** *DC.* (No. 3095): shrub 2½–3 ft., densely leafy, leaves acicular, glabrous; heads yellow, crowded at the ends of the shoots. **Tripteris** *sp.* (No. 3091): much-branched shrub 2–3 ft., with rigid subspinescent branchlets; leaves lobulate; heads yellow, small, solitary.

CRASSULACEAE—**Crassula corymbulosa** *Link & Otto* (No. 3082): leaves in a rosette, ovate-lanceolate, pointed, frilled with papillae; flowers small, white, in raceme-like cymes. **C. lanuginosa** *Harr.* (No. 3088): on ledges of rocks in shade; much-branched herb, densely setose-pilose. **C. filamentosa** *Schoenl.* (No. 3089): tiny herb with short slender branches and clustered very small fleshy leaves.

SCROPHULARIACEAE—**Sutera aurantiaca** (*Burch.*) *Hiern* (No. 3093): small shrublet, leaves glandular, pinnatifid, flowers pale mauve.

GERANIACEAE—**Pelargonium abrotanifolium** *Jacq.* (No. 3077): gnarled and woody, with very small cut leaves.

LABIATAE—**Stachys rugosa** *Ait.* var. **linearis** *Skan* (No. 3094): hanging over banks by dry stream bed; base woody with a long woody taproot; leaves linear, entire, mealy-pubescent; flowers axillary, subsessile.

MONOCOTYLEDONS

LILIACEAE—**Asparagus microraphis** *Baker* (No. 3076): cladodes short, in fascicles, very acute.

We descended from the mountain about noon, and proceeded on a fairly good road, the veld greatly improving as we reached Middelburg and becoming true Karoo.

From Middelburg we visited the Grootfontein School of Agriculture and noted great stands of Lucerne for experiments to show the effects of varying quantities of water. Potatoes and mealies were also being grown for the same purpose. Experiments were being carried out to assist farmers to preserve their sheep during periods of drought.

On Wednesday, 6th March, we made an excursion to Tafelberg farm, some few miles away, a place visited by Burchell. On the way

we collected a few species.¹ Burchell gave an excellent sketch of the Tafelberg. The owner, Mr. Van Ryneveld, showed us his garden, all irrigated, with grapes and figs thriving in great abundance right in the midst of country which to the ordinary eye seems almost a desert. We climbed the Tafelberg, about 1800 ft. above the plain, a very rocky mountain and poor for botanising, nearly everything being eaten by stock. There are fine views in all directions from the top of the mountain.

Right on the flat top of the mountain we collected *Ipomoea argyreoides* Choisy (CONVOLVULACEAE) (No. 3107), in flower and fruit, erect, 1-1½ ft.; leaves linear-oblongate, minutely pubescent; flowers solitary, deep mauve; fruits ovoid, pointed, 2.5 cm. long; *Eriocephalus glaber* Thunb. (COMPOSITAE) (No. 3108), a common shrub, 2 ft., with numerous branchlets bearing fascicles of very small, punctate leaves and spikes of woolly heads; *Chilianthus lobulatus* A.DC. (LOGANIACEAE) (No. 3108a), a shrub, 4 ft., with rugose-bullate Oak-like leaves and small flowers glomerate in short panicles; *Androcymbium melanthioides* Willd. (LILIACEAE) (No. 3109), a herb with broadly linear acute leaves, and dull white, ovate, tailed bracts striped with green.

On the farm we found very few plants in flower, except *Malvastrum crozophoroides* Stapf (MALVACEAE) (No. 3110), a small shrub with triangular, stellate-tomentose leaves and shortly stalked, mauve-crimson flowers; *Salsola nigrescens* C.A. Smith (CHENOPODIACEAE) (No. 3112), a glabrous, much-branched, very woody-based shrublet, drying blackish; leaves fleshy, ovate, keeled, small; and *Crassula lineolata* Dryand. (CRASSULACEAE) (No. 3113), a weak herb with ovate-acute, spotted leaves and terminal clusters of pinkish-white flowers on slender pedicels.

As a storm appeared imminent, we returned to the hotel as fast as possible; and it was a storm, to be sure, with very vivid lightning very near us, accompanied by deafening thunder, and the rain hissed down in sheets.

Next morning (7th March) I parted with Dr. Phillips at Rosemead Junction, whence he returned to Pretoria by train, and in the afternoon Dyer and I went westwards towards Richmond,² but there was little to be found in the dry, rocky country at this season. South of Middelburg³ we had collected a few species.

On Friday, 8th March, we started early for Graaf Reinet, and found better collecting grounds at Roode Hoogte and in Naude's Pass (4740 ft.). At Roode Hoogte the following were in flower: *Lasiosiphon microphyllus* Meisn. (THYMELAEACEAE) (No. 3118), stems numerous and short from a woody rootstock; flowers greenish-yellow; *Tragus*

¹ Plants collected: No. 3098, *Walafrida geniculata* Rolfe (SELAGINACEAE); 3099, *Convolvulus hastatus* Thunb. (CONVOLVULACEAE); 3100, *C. Dregeanus* Choisy; 3102, *Dimorphotheca multifida* DC. (COMPOSITAE); 3104, *Lycium schizocalyx* C.H. Wright (SOLANACEAE); 3105, *Zygophyllum incrustatum* E. Mey. (ZYGOPHYLLACEAE); 3106, *Adenachaena parvifolia* DC. (COMPOSITAE).

² Collected west of Middelburg: No. 3127, *Notholaena Eckloniana* Kze. (FILICES); 3128, *Pentzia sphaerocephala* DC. (COMPOSITAE); 3129, *Pegolettia polygalifolia* Less. (COMPOSITAE).

³ Collected south of Middelburg: No. 3114, *Bulbine asphodeloides* R. & S. (LILIACEAE); 3115, *Clematis brachiata* Thunb. (RANUNCULACEAE); 3116, *Rhus divaricata* Eckl. & Zeyh. (ANACARDIACEAE); 3117, *Chrysocoma tenuifolia* Berg. (COMPOSITAE).

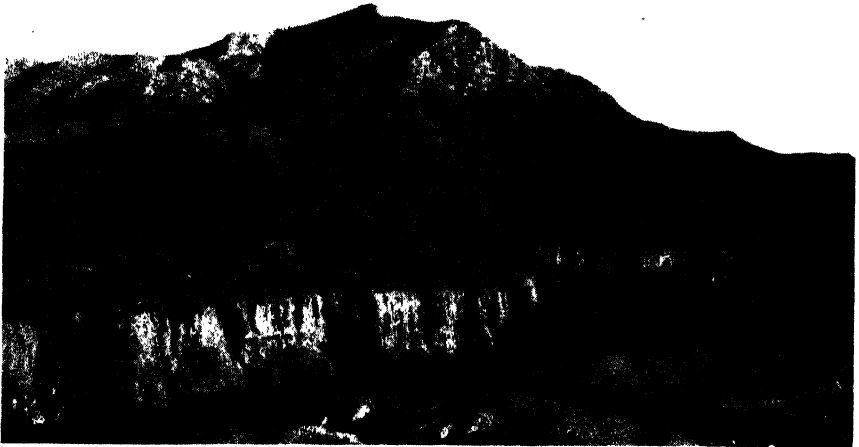
koelerioides Aschers. (GRAMINEAE) (No. 3119), leaves very small, glaucous, sparingly setose on the margin; spikes long-stalked, bristly; *Helichrysum niveum* (L.) Less. (COMPOSITAE) (No. 3120), leaves small, oblanceolate, felted below, heads small, golden-yellow in small, dense corymbs; *H. Dregeanum* Sond. & Harv. (No. 3121), similar, but heads few and larger, grey; *Microloma Massonii* Schltr. (ASCLEPIADACEAE) (No. 3122), dwarf and very woody at the base, with short green stems and tiny opposite, ovate leaves and sessile clusters of small, dull-yellow flowers; *Pentzia sphaerocephala* DC. (COMPOSITAE) (No. 3123), with deeply flabellately divided leaves and long, pedunculate heads. *Eriocephalus glaber* Thunb. (COMPOSITAE) (No. 3124); *Pelargonium carnosum* Ait. (GERANIACEAE) (No. 3125), stems very weak; leaves few, doubly pinnatifid, and long-pedunculate umbels of deep pink-crimson flowers; *Selago corymbosa* Linn. (SELAGINACEAE) (No. 3126), a small shrub, with elongated branches covered with fascicles of small, ericoid, glabrous leaves, and close corymbs of small white flowers.

In Naude's Pass we gathered an endemic Mint, *Mentha capensis* Thunb. (LABIATAE) (No. 3130), a typical Mint like the common garden species; *Euryops racemosus* DC. (COMPOSITAE) (No. 3131), very common on the hills, and giving them everywhere a yellow colour, a shrublet with rugose branches, short, acicular, glabrous leaves and terminal clusters of yellow heads; and a *Morea*, *M. polystachya* Ker (IRIDACEAE) (No. 3132) a "tulip", about 2 ft. high, poisonous to stock, and with several purple flowers.

In the late afternoon we reached Graaff Reinet by a fairly good road, and with few gates! The town is a vivid contrast of the surrounding country, and is a striking example of the fertility and possibilities of the driest parts of the Karoo when a plentiful supply of water is available. Many of the streets are lined by fine trees of *Cupressus macrocarpa*, Pines, and English Elms, and the gardens were full of grapes and figs, etc. I never could resist a good ripe fig, so in wandering along a quiet street I must have gazed rather longingly at some trees of tempting-looking figs in a garden, because presently a voice said "Good-day" and invited us to climb a fig tree and help ourselves. Never had I tasted such figs. Even stolen grapes could not have been more delicious.

In the afternoon we climbed past the native compound, but there was nothing much to be found. Prickly pear was everywhere densely naturalized, and a great pest. But now that the prickles have been found to provide some of the best needles for gramophones, some profit may be made from it.

On Sunday morning, 10th March, we left Graaff Reinet for Kendrew, about 18 miles along the road to Port Elizabeth, for it was here that we expected to find *Euphorbia obesa* Hook. f., a remarkable fleshy species, and at that time a great curiosity in cultivation in Europe. We found numerous examples growing in sandy loam on a sandstone kopje. We collected about two dozen specimens, and these subsequently flourished for some years at Kew, where the species is still to be seen. This interesting species has a very restricted distribution. I also noticed hereabouts a tiny tortoise about an inch in diameter. It started to rain as we returned to Graaff Reinet, and it rained steadily all the afternoon and evening. Towards Kendrew we had motored alongside the



[Photogr. : I. B. Pole Evans, Sept. 1929.]

Aasvogelberg, Willowmore, Cape. Bush consists of *Pappea capensis* (SAPINDACEAE), *Euclea undulata* Thunb. (EBENACEAE), *Capparis albitrunca* Gilg (CAPPARIDACEAE), *Lycium arenicola* Miers (SOLANACEAE), *Melianthus comosus* Vahl (MELIANTHACEAE), and *Salsola Zeyheri* Schinz (CHENOPODIACEAE); note the badly eroded country.



[Photogr. : I. B. Pole Evans, Sept. 1929.]

"Mesembryanthemums" in the Karoo between Willowmore and Beaufort West.



[Photogr. : I. B. Pole Evans, Sept. 1929.]

Euclea undulata Thunb. (EBENACEAE), in the Karoo near Willowmore, Cape Province.



[Photogr. : I. B. Pole Evans, Sept. 1929.]

Aloe striata Haw. (LILIACEAE) and *Asparagus* sp. (LILIACEAE), between Aberdeen Road and Klipplaat, Cape Province.

irrigation canal, full of water brought from quite 20 miles away above Graaff Reinet.

Next morning (11th March) we left Graaff Reinet for Aberdeen. For some time the country on this route is rather hilly, and clothed with a type of bush reminding me very much of that of Namaqualand. We arrived at Aberdeen at 11.30, and put up at the hotel. In the afternoon we explored the kopjes to the north-west of the dorp, but failed to find *Mesembryanthemum Bolusii* Hook. f. (now called *Pleiospilos Bolusii* N.E. Br.), but later, farther to the south-west, on the left-hand side of the road to Willowmore, after an hour's search, we located quite a quantity. I enlisted the help of some native children, and their eyes were much sharpened by the promise of a "tickey",¹



[Photogr. : I. B. Pole Evans, Sept. 1929.]

Aloe speciosa (LILIACEAE), *Cotyledon paniculata* (CRASSULACEAE), *Euclea undulata* Thunb. (EBENACEAE), and *Crassula perfossa* Linn. (CRASSULACEAE), between Willowmore and Klipplaat.

and we soon had a fine collection. They grew among sandy loam and stones about the same size as themselves, and similarly speckled, and were quite difficult to detect at first. I sent off a number of plants and some of the stones to Kew, and these were exhibited at a meeting of the Royal Society of London a few months later, and aroused some interest.

Next day towards the Groote River² we collected a few plants, but there was very little in flower at this late season. Somewhat to our consternation, we found the Groote River living up to its name, for it

¹ Threepenny bit.

² Collected towards the Groote River (from Aberdeen) : No. 3133, *Justicia orchioides* Linn. f. (ACANTHACEAE); 3134, *Pharnaceum verrucosum* Eckl. & Zeyh. (FICOIDACEAE); 3135, *Lebeckia spinescens* Harv. (PAPILIONACEAE); 3136, *Galenia pubescens* (Eckl. & Zeyh.) Druce (MOLLUGINACEAE); 3136a, *G. sarcophylla* Fenzl; 3137, *Zygophyllum simplex* Linn. (ZYGOPHYLLACEAE).

was in heavy flood, and impossible to cross with a car. As there seemed no habitations thereabouts, we went back for about 6 miles, and called at Mr. Greeff's farm at Hoogekraal, where we were kindly accommodated for the night.

Next morning (13th March), we returned to the river at nine o'clock, but it was still too high. Another car party was waiting to cross, which we accomplished at 10.45, the rivers in these regions falling almost but not quite so quickly as they rise, the floods being due to storms or cloud-bursts many miles inland. On arrival at Willowmore we packed up a box of succulents and sent them off to Kew, the box costing 4s. 9d. from here to Cape Town, where they were to be sent on to England by Messrs. Thos. Cook and Sons. I mention this because the transmission



[Photogr. : I. B. Pole Evans, Sept. 1920.]

Euphorbia horrida L. (EUPHORBIACEAE), near Willowmore, Cape Province.

of specimens by passenger train in South Africa is rather expensive. Petrol at Willowmore at that time was 2s. 9d. per gallon !

At Willowmore I was much interested to see Mr. Codner's farm, "Finchley", where, by means of scientific irrigation and conservation of water, he has created out of the arid karoo a veritable oasis. This was well described by A. Stead¹ a few years previously. Mr. Codner, a store-keeper in the town, showed us his place personally, but as his story had then been published, I shall give only a *résumé* of Stead's account (*l.c.*). It seems the battle had been commenced some twenty years previously, "and man has triumphed, making the leegte yield him food to eat, water to drink and play with, as well as a wealth of pleasurable surroundings, which in themselves are a sufficient reward for enterprise and the price of victory" (Stead, *l.c.*, p. 316).

¹ A. Stead, B.Sc., F.I.C., "Saaidam Terraces in the Karoo", *S. Afr. Journ. Sci.*, 21 : 315-321 (1924).

The rainfall at Finchley is hopelessly low, and too unfavourable in distribution for growing crops in the ordinary veld. Nevertheless they are now there, because of the construction of a series of terraces, known as *saaaidam* terraces, one below the other, by building stone walls right across the leegte at suitable points (especially in narrow places) and levelling the ground behind them as perfectly as possible, scraping the soil from the sides into the main water channels as well as downstream towards the retaining walls.

According to Stead, the total length of the seven *saaaidams* at Finchley is about 1000 yards, and the walls are at intervals of about



[Photogr. by the Author.]

R. A. Dyer in desolate country near Klaarstroom.

100 to 200 yards. The wall is about 9 inches higher than the surface of the soil behind it, and the maximum height of individual walls varies from 2 to 9 feet.

Crops, including oats, barley and mealies, had been obtained without fail from these *saaaidams* for the past twenty years, and, once constructed, there are no further irrigation expenses. When the water comes down, it spreads slowly over the surface of the first terrace; if sufficient, it will pass over the top of the wall and fall on the stone apron of the second terrace, and so on, the cost of raising the crops being restricted to tith, sowing and reaping. A single thorough initial wetting of the soil to a depth of several feet is enough in this region to produce crops. I commend the reader, and others interested in irrigation, to Mr. Stead's paper. It was very remarkable to find Mr. Codner's farm nestling in a setting of exotic trees by a pond and croquet lawn.

Adventures in Meirings Poort

Friday, 15th March, proved to be an eventful day, and quite the most exciting of my whole tour; no snakes this time, but something much more dangerous. We left Willowmore at 10 o'clock, after posting off several parcels of succulents to Kew. The country between Willowmore and Klaarstroom was very dry, being stricken with drought, and closely similar to that I had seen in October between Montagu and Barrydale. We found nothing worth collecting all the morning, and we had a picnic lunch in view of Meirings Poort, a long, rocky defile, little dreaming what that place had in store for us. We reached Klaarstroom at 2.30, intending to stay the night, but after consulting the postmaster, decided that it was no use remaining in this area, and began the descent of Meirings Poort, a well-wooded gorge, and a delightful contrast to the monotonous Little Karoo we had left behind.

The weather at the head of the Poort was then quite fine, but intensely hot, with here and there a heavy cloud, and no signs of a storm. So we descended into the Poort light-heartedly enough, though we knew that we should have to drive the car through the river at least thirty-two times. By the time we had crossed it nine times we had collected a few flowering trees and shrubs: *Heteromorpha arborescens* Cham. & Schl. (UMBELLIFERAE) (No. 3145), *Aspalathus capitata* L. (PAPILIONACEAE) (No. 3146), *Cunonia capensis* L.f. (CUNONIACEAE) (No. 3147), and *Clematis brachiata* Thunb. (RANUNCULACEAE) (No. 3148).

At the tenth crossing of the river, which happened to be rather a wide one with steepish banks on each side, disaster overtook us. In the middle of the ford something gave way. The car stopped and refused to move, though the engine continued to tick over quite happily. We climbed out into the water, and found, to our consternation, that the bolts of the differential had broken, and our car was helpless, and stranded in the middle of a deep drift many miles from the village at the foot of the gorge. In addition, as heavy clouds were gathering over the top of the pass, a thunderstorm might break on us at any moment, and add to our difficulties; and it was necessary to do something very quickly indeed if we were to save the car and our personal luggage, cameras and collecting outfit, including most of my field books, which would have been a serious loss to me.

After an abortive attempt to push it to the side of the drift, we decided to relieve the car of as much weight as possible. This we did as quickly as we could, and managed to place our belongings beneath an overhanging rock high up the cliff-face. There they were sheltered from the rain, which was now pelting down, accompanied by vivid flashes of lightning and loud crashes of thunder. Soaked to the skin, we pushed and pushed the car inch by inch, using a floorboard and a branch of a tree as a lever, and to our great joy succeeded in getting it to the edge of the water, but no farther, as the bank was so steep. There we had to leave it, with the wheels propped up with stones, hoping that these would prevent it being washed away by the water, which was rising rapidly. I tied the car to a strong rope attached to a large rock.

All we could do now was to set out for help from the village of De Rust, near the foot of the Poort, almost ten miles away. And to reach the village we would have to wade through the rising river at least

twenty-two times! We had trudged along for about half an hour when, to our great relief, we heard a car coming down the pass behind us. We hailed the driver, hoping for a lift, but he had his wife and several children with him, and he was very anxious to get them to safety out of the pass. He very kindly promised, however, to try to obtain help for us at the village, and we continued our tramp, hoping for the best.

Nearly an hour elapsed, and we were getting anxious, and very tired from the heavy wading and pouring rain, and I was burdened with a weighty camera, which I tried to keep dry under a thin mackintosh. At long last, however, we paused, thinking we had heard the sound of a car coming up the pass, but it seemed to have raised false hopes until a few minutes later, when we distinctly heard it whining up the ascent. It was sweet music indeed to our anxious ears. At length it came into view, and I was never more grateful to any human beings than I was to the three men who hailed us—the local doctor, a planter, and the garage proprietor, who had most kindly come to our rescue at great risk to themselves and to their car. Dr. Smit had brought with him a supply of firewater made from locally grown grapes, and, unaccustomed to such undiluted liquid, I gasped at the first mouthful. However, no doubt it saved me from pneumonia, and whilst my companion walked on to the village, I returned in the car to the scene of our disaster.

The water in some of the drifts was now so high that we were very doubtful whether we could reach the car, but we managed to do this at last, and it was soon pulled out of the stream and, loaded with our impedimenta, was being towed down the pass to safety.

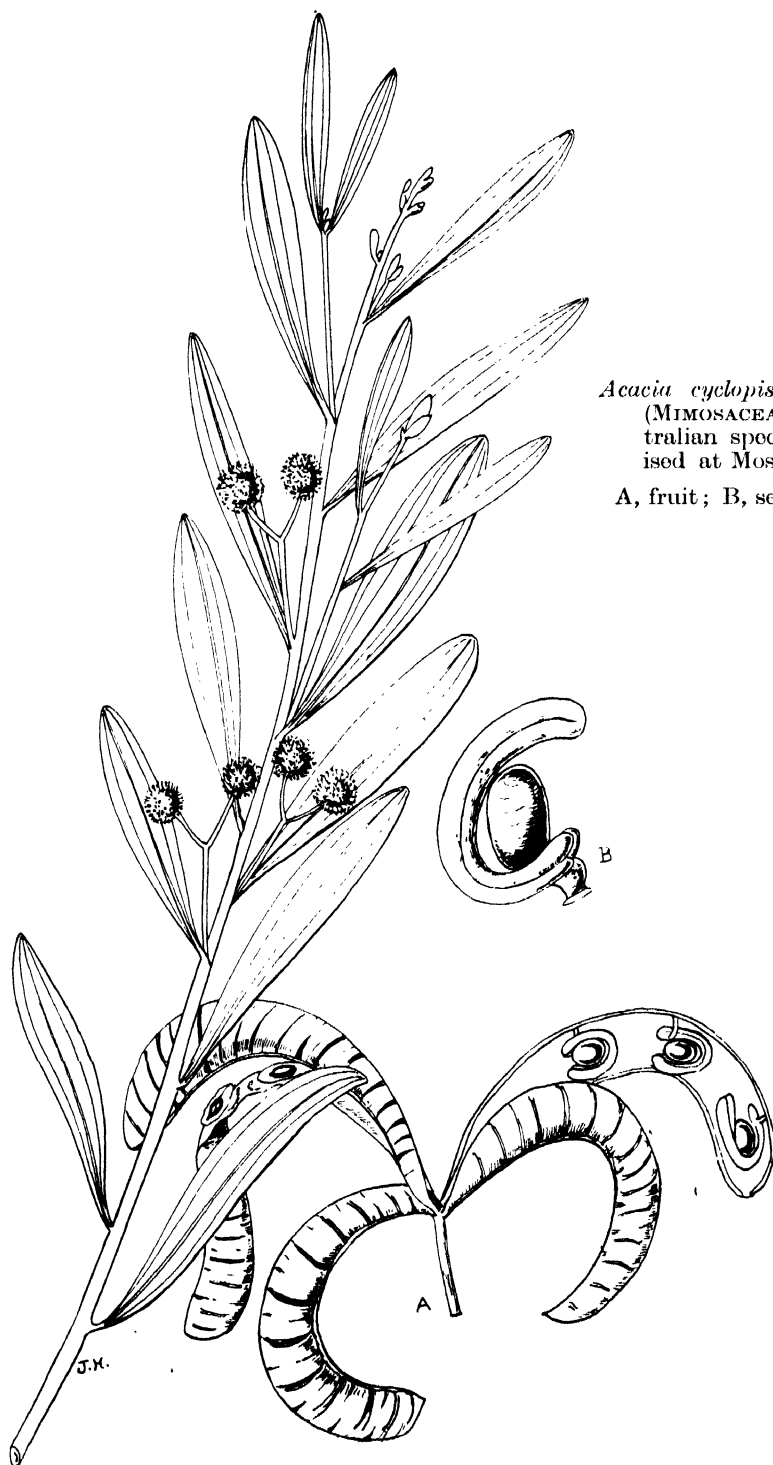
I did not fully realize the great danger we had been in until half an hour or so after we reached the village, when another cloudburst at the top of the pass precipitated a wall of water several feet high, carrying all before it and rendering the road impassable for weeks. Had we not been assisted in the nick of time, our car and all our belongings would no doubt have been lost.

I arranged with the garage proprietor at De Rust for the necessary repairs, and as this meant a delay to me of at least a week, until spares could be obtained from Cape Town, I took the opportunity of having a rest from collecting. Mr. Du Fosse kindly asked me to visit his farm two or three miles away, where I saw fine stands of tobacco and sampled delicious grapes such as furnished the brandy I had imbibed the day before. A pair of ostriches with five young ones was to me a novel sight.

In the afternoon, Mr. Dyer, none the worse for his wetting the previous day, left for Le Roux station, 5 miles away, on his return to Grahamstown. I was sorry indeed to part with him, although he had not intended going much farther with me.

On Monday morning, 18th March, I was up at 5.30, and caught the 6.30 train from De Rust for George¹ and Mossel Bay, where I stayed

¹ Collected near George, 19th March: No. 3165, *Psoralea oligophylla* Eckl. & Zeyh. (PAPILIONACEAE); 3166, *Erica cristaeiflora* Salisb. (ERICACEAE); 3167, *Struthiola hirsuta* Wikstr. (THYMELAEACEAE); 3168, *Cliffortia odorata* Linn. f. (ROSACEAE); 3169, *Selago corymbosa* Linn. (SELAGINACEAE); 3170, *Melasma sessiliflorum* Hiern (SCROPHULARIACEAE); 3171, *Athanasia dentata* Linn. (COMPOSITAE); 3172, *Podalyria Burchellii* DC. (PAPILIONACEAE); 3173, *Erica florida* Thunb. (ERICACEAE); 3174, *Cliffortia strobilifera* Linn. (ROSACEAE).



Acacia cyclops A. Cunn.
(MIMOSACEAE), an Australian species naturalised at Mossel Bay.

A, fruit; B, seed and aril.

and rested for a few days until Friday, 22nd March, when I received notification from the garage at De Rust that the car was ready. At Mossel Bay ¹ I gathered only a few plants, including *Acacia cyclopis* A. Cunn. (MIMOSACEAE) (see figure, p. 445), naturalised in great quantity.

I returned to Cape Town without incident, via Oudtshoorn, Robinson Pass, Albertinia, Riversdale, Heidelberg, Swellendam, Storms Vlei, Caledon, Hermanus, Bot River and Grabouw, where I looped the loop of my long journey, and thence to Cape Town. I did not stop to collect very much, as my time was getting short, and it was now winter in the Cape region. I keenly regretted not having the time to call on Dr. Muir at Riversdale. I was much impressed on this journey by the vast



[Photogr. : I. B. Pole Evans, Jan. 1934.]

Rivier Zonder Einde Mountains. *Elytropappus rhinocerotis* Less. (COMPOSITAE) in the foreground.

quantity of Rhenoster bush, *Elytropappus Rhinocerotis* Less., which has in many parts taken complete possession of the veld. At Robinson's Pass ² I collected a few plants, including *Indigofera flabellata* Harv. (PAPILIONACEAE) (No. 3150), a species with hoary, subsessile, 5-foliolate leaves and axillary clusters of small flowers; *Corymbium glabrum* Linn. (COMPOSITAE) (No. 3151), very woolly at the base, with sword-like, strongly nerved leaves and narrow flower-heads; *Anapalina revoluta* N.E. Br. (IRIDACEAE) (No. 3152), leafless, about 1½ ft., flowers red, and a species of *Erica*, *E. glandulosa* Thunb. (ERICACEAE) (Nos. 3153, 3155) with pilose glandular leaves and curved greenish yellow flowers.

¹ Also collected at Mossel Bay: No. 3177, *Atriplex semibaccata* R.Br. (CHENOPODIACEAE), an alien from Australia; 3178, *Crassula lycopodioides* Lam. (CRASSULACEAE); 3179, *Statice scabra* Thunb. (PLUMBAGINACEAE); 3180, *Gazania uniflora* Linn. (COMPOSITAE).

² Also collected at Robinson's Pass: No. 3149, *Acmadenia densifolia* Sond. (RUTACEAE); 3154, *Phyllica pinea* Thunb. (RHAMNACEAE).



[Photogr. : I. B. Pole Evans, Nov. 1934.]

Ornithogalum thyrsoides Jacq. (LILIACEAE), with *Sideroxylon inerme* Linn. (SAPOTACEAE) bush behind, between Gansbaai and Struis Bay, Bredasdorp District.



[Photogr. : I. B. Pole Evans, Nov. 1934.]

Helichrysum vestitum Less. (COMPOSITAE), in *Erica* and *Restio* veld near Hermanus, Cape Province.

Near Albertinia, *Erica diaphana* Spreng. (No. 3156) was in flower, with puberulous leaves and slightly curved corollas, style exserted; and at the River Zondereinde, *Leonotus Leonurus* L. (LABIATAE) (No. 3157), was about the only conspicuous plant in bloom, with brilliant orange-red flowers.

Between Caledon and Hermanus (26th March) I collected *Gnidia simplex* Linn. (THYMELAEACEAE) (No. 3158), with glabrous leaves and rather inconspicuous flowers, and *Stoebe capitata* Berg. (COMPOSITAE) (No. 3161), a small shrublet with slender, elongated branches and small, ericoid leaves, and ovoid heads about 1 cm. diameter, and three species of ERICACEAE, *Erica corifolia* L. (No. 3159), very floriferous, the calyx as long as the corolla and both bright carmine, *Blaeria purpurea* (Thunb.) L.f. (No. 3160), a shrublet 9 ins. high, with loose clusters of small crimson pendulous flowers, and glabrous leaves, and *Erica discolor* Andr. (No. 3162), branchlets ascending; leaves with scabrid margins; corollas slender, curved, pinkish-red.

At Hermanus I collected two more species of ERICACEAE, *Blaeria ericoides* Linn. (No. 3163), intricately branched, with pilose leaves, and pink flowers with exserted stamens, and *Erica lutea* Linn. (No. 3164), nearly 1 ft. high, with appressed glabrous leaves and yellow calyx and corolla, the latter pointed in bud.

At Cape Town an excursion with General Smuts and Professor Compton up Table Mountain on 5th April, and one to Zekoe Vlei¹ with Miss Stephens on 9th April completed my tour of South Africa.

In the Cecilia Gorge,² Table Mountain, a striking plant was *Hermas villosa* Thunb. (UMBELLIFERAE) (No. 3184), and *Amphitalea imbricata* (Linn.) Druce (PAPILIONACEAE) (No. 3187), a tall, graceful shrub with very beautiful deep-mauve flowers.

As a warning to others I may perhaps record that in gathering a specimen of *Stoebe prostrata* Linn. (COMPOSITAE) (No. 3193) I nearly ended my career. It grew above a large piece of sandstone jutting out from the steep face of the mountain, and in climbing up to it I grasped the stone to reach the plant. Without the slightest warning the huge stone rolled out past my shoulder down the mountain-side, myself with it, just missing Professor Compton's retriever dog, which had followed me. I turned several somersaults, and fortunately landed in some bushes about 20 ft. below, none the worse for the fall. My thoughts whilst falling, strange to say, were not of the sins I had committed during my life, but were wholly concerned with the fate of the dog.

So, after completing the numbering and sorting of my collection into three sets—one for the Kew Herbarium, a second for the Bolus Herbarium, and a third for Pretoria—a task for which Mrs. Bolus gave me every facility at the Bolus Herbarium, I set sail for England on 12th April on board the R.M.S. *Balmoral Castle*.

¹ Collected: No. 3195, *Lobelia erinoides* Thunb. (LOBELIACEAE); 3196, *Salicornia natalensis* Bunge; 3197, *Senecio halimifolius* Linn. (COMPOSITAE); 3198, *Senecio elegans* Linn.; 3199, *Helichrysum serpyllifolium* Less. (COMPOSITAE).

² Also collected: No. 3181, *Royena lucida* Linn. (EBENACEAE); 3182, *Cliffortia odorata* Linn. f. (ROSACEAE); 3183, *Cluytia pulchella* Linn. (EUPHORBIACEAE); 3185, *Erica purpurea* Andr. (ERICACEAE); 3186, *Erica nudiflora* Linn.; 3188, *Priestleya villosa* DC. (PAPILIONACEAE); 3189, *Indigofera cytisoides* Lam. (PAPILIONACEAE); 3190, *I. filifolia* Thunb.; 3191, *Phytica bicolor* Linn. (RHAMNACEAE); 3192, *Erica marifolia* Soland.; 3194, *Leucadendron* (hybrid?).



[Photogr. : I. B. Pole Evans, Feb. 1934.]

Thamnochortus insignis Mast. (RESTIONACEAE), near Storms Vlei, Swellendam District, Cape Province.



[Photogr. : I. B. Pole Evans, Nov. 1934.]

Aristea capitata Ker (IRIDACEAE) with *Asparagus* sp. in the foreground, near Hermanus, Cape Province.

I had met many people during my travels and received much assistance wherever I went, and on my departure I sent to as many as I could remember the following message, pictorially embellished with flowers, within an outline map of South Africa :—

“ Before leaving South Africa I wish to express my warmest thanks to the many kind friends who have helped so much to make my tour a success.

“ At every stage, from Cape Point to the Limpopo, the rough pathways have been made smooth by the warm hospitality and assistance accorded me, and the pleasant days botanising with new and old friends will ever remain a happy memory. I am sure that the 7000 odd miles of country traversed and the 3000 species of plants collected could not have been accomplished without their co-operation.

“ I trust that to all of them it may not be ‘farewell’, but only ‘tot weersien’ ”.¹

¹ That it proved to be only *au revoir*, is shown in the next chapter.

PART IV

GENERAL SMUTS' BOTANICAL EXPEDITION TO LAKE TANGANYIKA

Chapter XXVII

FROM PRETORIA VIA ZIMBABWE TO THE VICTORIA FALLS

AS may be learned from the foregoing pages, I had the good fortune to accompany General Smuts to the Northern Transvaal and to stay with him on his farm at Irene during my tour in 1928-9. When botanising with him he would often stand and look northwards and say how much he would like to take me there some day. I little dreamed that the "some day" would so soon arrive.

When the General was in England in 1929 for the League of Nations Conference, he mentioned his project of an expedition to Northern Rhodesia to my director, Sir Arthur W. Hill, K.C.M.G., and I am very grateful indeed that the latter made it possible for me to accept the General's kind invitation. The Empire Marketing Board was fortunately still in existence, and funds were available for scientific expeditions, for my fare to Cape Town and back, and for the return railway journey from Cape Town to Pretoria. From Pretoria to Lake Tanganyika and back to Broken Hill I was the guest of General Smuts, who provided the motor transport and food for the whole expedition, except one Ford car supplied by Mrs. Arthur Gillett.

I travelled to South Africa on the *Carnarvon Castle*, arriving at Irene on Thursday evening, 26th June, having as companions Mrs. Arthur Gillett and her two sons, Jan and Anthony. The first two had been with us previously in the Northern Transvaal, and had then assisted me in collecting in every possible way. They contributed largely to the success of the expedition, Mrs. Gillett and Jan being keen botanists and collectors, and Anthony an efficient motor-driver. Another driver who must be specially mentioned was General Smuts' youngest son, Jannie, who drove his car from Pretoria to Lake Tanganyika and back without intermission.

From Pretoria as far as the Victoria Falls our party formed an imposing cavalcade, consisting of seven cars, our leader, General Smuts, driving his Buick, his son Jannie driving a Hudson, with a native servant, and most of the bedding; and besides the Ford, there was a Chevrolet car, and three other cars, in which were Mrs. Smuts and her two daughters, and General Smuts' brother and son-in-law. At the Beit bridge over the Limpopo was Dr. I. B. Pole Evans, with two assistants, in his imposing lorry-caravan (see photograph on p. 452).



[Photogr. : I. B. Pole Evans.

The Botanical Survey caravan No. 2 leaving the Limpopo Valley on its trip to Tanganyika.



{Photogr. by the Author.

Three of the younger members of our party; from the left, Jannie Smuts, Anthony and Jan Gillett.

In high spirits our party started from "Doornkloof", General Smuts' residence at Irene, early on Saturday morning, 28th June.

At definite localities where a fairly large collection was made I have enumerated systematically the plants gathered, and have added a short description for the use of any botanist or interested traveller who may happen to visit these spots about the same time of year. This has been done especially for Southern Rhodesia, which is more frequented by Europeans than the part of North East Rhodesia through which we travelled. For example, the plants found on the Lundi River, at the Zimbabwe Ruins, the Victoria Falls Rain Forest, and the dry forest

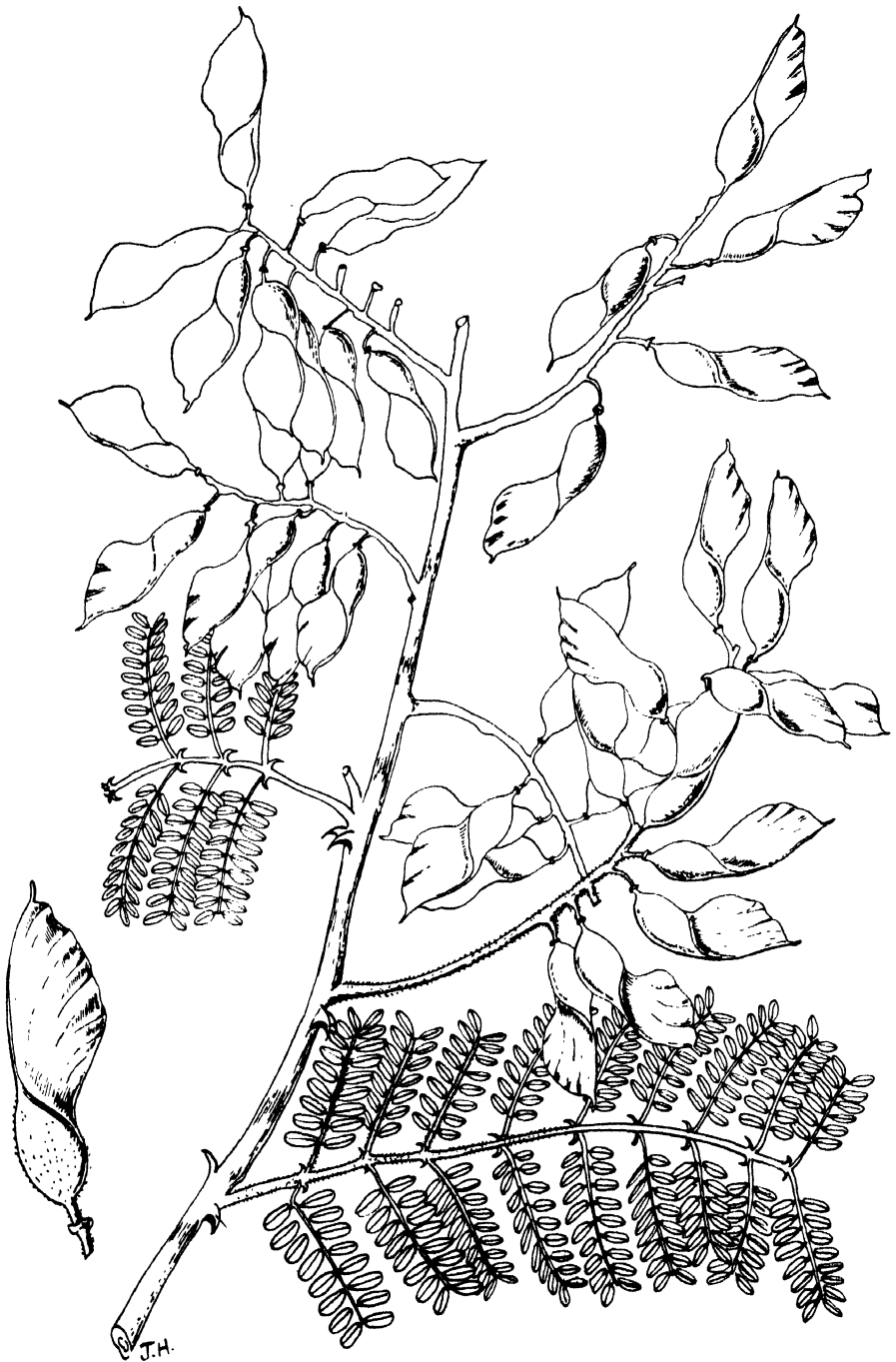


(Photogr. : Mrs. Gillett.

Euphorbia ingens E. Mey. (EUPHORBIACEAE) at Matoks.

nearby, and those found in the vicinity of Abercorn and the south end of Lake Tanganyika have been treated in this way. With respect to those gathered on the long journey from the Falls to Abercorn, however, it seemed best to give separate accounts of the plants collected over each 100-mile stretch of the route. And it was rare indeed that we gathered the same species from more than one locality, which shows that the flora, at least in species, changes gradually as one proceeds northwards.

At this winter season the early morning on the high-veld of the Transvaal is usually very cold, and on this occasion there had been several degrees of frost during the night. As I had previously visited Pretoria in the middle of summer, I was much struck by the contrast in midwinter, the veld looking very brown and dried up, and the vegetation by the roadsides covered with dust. The road, however, was in fairly good condition, and now quite familiar to me.



Pterolobium exosum (R. Br.) Bak. f. (CAESALPINIACEAE), with bright red winged fruits, in Wylie's Poort.

Near Pienaar's River the "*Triumfetta veld*" (*Triumfetta Sonderi* Fic. & Hiern), so conspicuous in summer (see figure, p. 292), was now scarcely recognisable as such.

Our first camp was beyond Potgietersrust, and we slept on thin-ribbed mattresses on the ground alongside the cars. We slept thus throughout our tour in Rhodesia, though it was a somewhat risky business in some parts of the country, especially north of the Zambesi, but the cars standing by were considered to be sufficient to scare away wild animals. At this season the vegetation beyond Potgietersrust was quite uninteresting from the collector's point of view, and the bushveld farther north was even less attractive.

An early start next morning enabled us to reach Louis Trichardt in good time, and we proceeded northwards again *via* Wylie's Poort. By the roadside ascending to the Poort was a mass of a fine *Cineraria*, *C. monticola* Hutch (No. 3201), a new species,¹ in full flower. Here and there through the Poort, *Pterolobium exosum* (R.Br.) Bak. f. (CAESALPINIACEAE) (No. 3204), was scrambling over other vegetation, and gave quite an autumn tint with its bright-red, winged fruits. In the gorge towards the northern entrance the whole party lunched, and we botanised on the neighbouring slopes, where we collected a species of *Kalanchoë*, *K. Rogersii* R. Hamet (CRASSULACEAE) (No. 3203), with pretty red flowers.

Other plants collected here are arranged in systematic order as follows :—

Plants collected at the Northern Entrance to Wylie's Poort, Zoutpansberg

LIGNOSAE (WOODY DICOTYLEDONS)

ANNONACEAE—*Hexalobus glabrescens* Hutch. & J.M. Dalz. (No. 3206) (see p. 317).

SAPOTACEAE—*Mimusops Zeyheri* Sond. (No. 3228).

CAESALPINIACEAE—*Pterolobium exosum* Bak. f. (*P. lacerans* R. Br.) (see notes above and figure on p. 454).

PAPILIONACEAE—*Argyrolobium tomentosum* B. Davy (No. 3216): straggling shrub; leaves trifoliolate, leaflets elliptic, mucronate; flowers yellow, few on leaf-opposed peduncles.

POLYGALACEAE—*Polygala speciosa* Sims (No. 3202): growing by stream, near the road; flowers carmine.

TILIACEAE—*Corchorus pongolensis* B. Davy (No. 3226).

EUPHORBIACEAE—*Dalechampia Kirkii* Prain (No. 3227): twiner, with unequally 3-5-lobed leaves.

RHAMNACEAE—*Zizyphus mucronata* Willd. var. *pubescens* Sond. (No. 3229): small tree or shrub with ovate 3-nerved crenate leaves and globose fruits 2 cm. diam.

ARALIACEAE—*Cussonia spicata* Thunb. (No. 3209): leaves digitately divided into several segments, the latter petiolulate and pinnately- or tri-partite; flowers in simple clustered spikes on longish peduncles. *C. umbellifera* Sond. (No. 3222): leaflets entire or dentate; flowers in compound umbels.

OLEACEAE—*Olea enervis* Harv. (No. 3217): small graceful tree 15 ft. high; leaves narrowly obovate, apiculate, glabrous; cymes terminal, sessile; apparently a rare and little known species.

APOCYNACEAE—*Landolphia Kirkii* Dyer (No. 3230): climber with small oblong leaves, and globose speckled fruits the size of a small apple.

¹ See *Kew Bulletin*, 1931: 251.

ASCLEPIADACEAE—**Secamone frutescens** Decne (No. 3220): twiner with linear glaucous leaves and twin narrow fruiting carpels, the seeds with very long silky hairs.

RUBIACEAE—**Gardenia globosa** Hochst. (No. 3219): a shrub 12 ft. in fruit and flower-bud, latter tomentose; fruit ellipsoid-globose, 1.5 cm. diam. **Randia rudis** E. Mey. (No. 3221): small shrub 6 ft.; leaves small, spatulate-obovate; fruits globose, 8 mm. diam., ribbed.

HERBACEAE (HERBACEOUS DICOTYLEDONS)

RANUNCULACEAE—**Clematis brachiata** Thunb. var. **Burkei** B. Dary (No. 3205): climbing over bushes; leaflets ovate, very coarsely dentate; in fruit, the fruit with longish tails.

AMARANTACEAE—**Pupalia lappacea** Juss. (No. 3215): a weedy herb up to 4 ft.; leaves elliptic-lanceolate; flowers sometimes in clusters, the sterile bracts with hooked tips.

CRASSULACEAE—**Crassula lineolata** Schönl. (No. 3246): prostrate herb with small obovate leaves and small white flowers. **Kalanchoe Rogersii** R. Hamet (No. 3203): slender herb; leaves obovate, entire; corolla orange-red inside, red outside. **Kalanchoe multiflora** Schinz (No. 3225): 3 ft., leaves ovate-lanceolate, coarsely crenate; flowers yellow, in panicles with long branches. **Cotyledon Barbeyi** Schweinf. (No. 3224): 2 ft. high; leaves obovate, entire, scurfy-papillous; flowers few, corolla red, 2.5 cm. long; stamens exserted.

COMPOSITAE—**Senecio subscandens** Hochst. (No. 3208): scrambling amongst bushes; leaves obovate, dentate; flower-heads yellow in close corymbs, rayless. **Tarchonanthus Galpinii** Phillips & Hutch. (No. 3222): small tree 14 ft., with bullate-reticulate obovate-elliptic leaves and narrow panicles of unisexual flower-heads.

SCROPHULARIACEAE—**Sutera micrantha** Hiern (No. 3207): herb, with small oak-like leaves and small yellow flowers.

ACANTHACEAE—**Justicia pulegioides** E. Mey. (Nos. 3210, 3211): straggly herb with very small leaves; flowers mauve-purple or cream with mauve markings; stamens 2.

LABIATAE—**Leucas glabrata** R. Br. (No. 3212): weak straggly herb, with ovate coarsely toothed leaves and clusters of white flowers. **Plectranthus hirtus** Benth. (No. 3213): stems weak, rooting towards the base; leaves small, coarsely dentate; flowers mauve-blue. **Coleus** sp. (No. 3214): small rhomboid-obovate coarsely dentate leaves, and narrow spikes of pale mauve flowers.

MONOCOTYLEDONS

LILIACEAE—**Aloe Marlothii** Berger (No. 3231) (see p. 375). **A. Chabaudii** Schönl. (No. 3232): 3 ft. high; inflorescence copiously branched; flowers red. **A. Boylei** Baker (No. 3233): up to 20 ft. high, inflorescence branched, flowers yellow. **Asparagus falcatus** Linn. (No. 3218): shrub with sharp thorns 1 cm. long; cladodes narrowly linear, acute, about 6 cm. long; fruit 1 cm. diam.

We passed Fogwell's Paradise, our former camping ground, and soon encountered fine specimens of the "Baobab" (*Adansonia digitata* Linn.) (see p. 457). About 8 miles farther on the dominant tree was the "Mopane" (*Copaifera Mopane* Kirk), which extends from the northern foot of the Zoutpansberg northwards to far beyond the Zambesi (see p. 458).

About 10 miles south of Messina we camped out in the bush, and as we were now into "lion country", we made a circle of the cars, spread our mattresses as near them as possible and hoped for the best. At this season the country thereabouts was in a parched condition, and little botanising was possible.¹

¹ We collected the following at this spot: 3234, *Calostephane divaricata* Benth. (COMPOSITAE); 3235, *Monechma Welwitschii* C.B. Cl. (ACANTHACEAE);

From Messina we crossed the Limpopo by the magnificent new bridge, whereon, as already stated, Dr. Pole Evans was waiting for us. He accompanied us as far as Lake Tanganyika and back, the two parties collaborating and frequently rendering mutual assistance. At this season the flat "Mopane" bush country as far as the Lundi River was almost a botanical desert, but here and there our attention was arrested by a clump of *Iboza riparia* (Hochst.) N.E. Br. (LABIATAE) (No. 3264), a beautiful shrub up to 8 ft., with large panicles of very small mauve flowers, and almost leafless at the time.

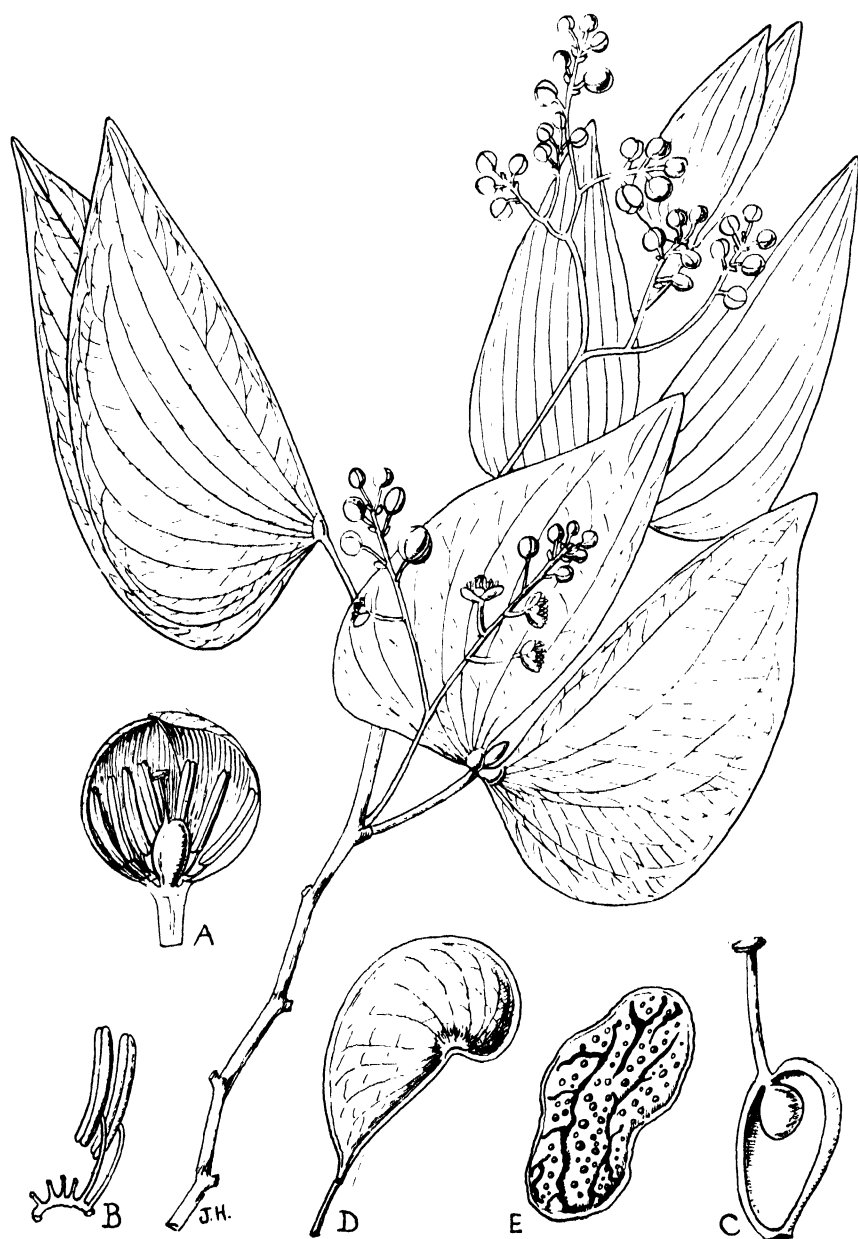


[Photogr. : Mrs. Gillett.]

Baobabs, *Adansonia digitata* Linn. (BOMBACACEAE) in the Limpopo Valley.

We arrived at the Lundi river in the late afternoon, and after selecting our camping site—which was sometimes a matter for discussion—we had a refreshing bathe in the cool waters. I lost no time in starting to collect, for I was now for the first time really among *tropical African plants*, which I had seen for so many years only in the dried state in the herbarium at Kew. My feelings may perhaps best be understood by those, who, in their youth, have for years laboriously pedalled a push bicycle and who have driven for the first time a motor bicycle or car. I experienced such a thrill when I first stepped among the plants near the Lundi river.

3236, *Justicia pulegioides* E. Mey. (ACANTHACEAE); 3237, *Combretum apiculatum* Sond. (COMBRETACEAE); 3238, *Grewia flavescens* Juss. (TILIACEAE); 3239, *Terminalia prunioides* LAWS. (COMBRETACEAE); 3240, *Aptosimum lineare* Engl. & Marloth (SCROPHULARIACEAE); 3241, *Hermannia modesta* Ehrenb. (STERCULIACEAE); 3242, *Sterculia Rogersii* N.E. Br. (STERCULIACEAE); 3243, *Barleria Rogersii* S. Moore (ACANTHACEAE); 3244, *Blepharis diversispinum* C.B. Cl. (ACANTHACEAE); 3245, *Justicia odora* Vahl (ACANTHACEAE).



Copaiifera mopane Kirk (CAESALPINIACEAE), dominant in the extreme north of the Transvaal and parts of Rhodesia.

A, vertical section of flower bud; B, two stamens; C, vertical section of ovary; D, fruit; E, seed showing the prominent resinous dots and canals.

I shall mention only a few of the more interesting plants gathered here, which are arranged systematically farther on. The first we collected was *Vernonia colorata* (Willd.) Drake (No. 3247), a large bush, 12–15 ft. high, with wide corymbs of pale-mauve flowers. Only a few weeks previously I had described this same species for the *Flora of West Tropical Africa*, for it enjoys a range from the Transvaal as far north as Senegal and Abyssinia. A *Gardenia* (No. 3249), with ellipsoid ribbed fruits about the size of a small orange, and with small obovate leaves, proved to be *G. spatulifolia* Stapf & Hutch. (RUBIACEAE) (see figure, p. 463). A striking tall herb was *Kalanchoe lanceolata* Pers. (CRASSULACEAE) (No. 3251), with hirsute stems, and a thyrsoid panicle of salmon-coloured flowers. *Jasminum mauritianum* Boj. (OLEACEAE) (No. 3252), a climber with three ovate leaflets and cymes of rather small white flowers, occurred near the river. Another peculiar climber in fruit was *Paederia foetens* (Hiern) K. Schum. (RUBIACEAE) (No. 3254), with panicles of clustered fruits, the latter compressed and ovate, shining, and with five persistent, filiform calyx-lobes resembling styles. Near the edge of the river I was interested to find *Sphaeranthus incisus* Robyns (No. 3261), a herb with carmine, broadly-ovoid flower-heads and narrow, finely-toothed leaves. *Sphaeranthus* is a remarkable genus, in that the heads are compound, composed of numerous smaller heads gathered together into one. A familiar tree, seen also on the Limpopo, was *Pseudolachnostylis maprouneifolia* Pax (EUPHORBIACEAE) (Nos. 3263; 3291); here it was 25 ft. high.

The kopjes near the river yielded further botanical treasures: *Dicoma Kirkii* Harv. (COMPOSITAE) (No. 3282), with linear leaves, cobwebby below, and sharp-pointed, silvery bracts; *Tinnea zambesiaca* Baker (No. 3285), a *Labiata* with bladder-like fruits and rather wonderful seeds covered with plumose bristles; *Myrothamnus flabellifolia* Welw. (MYROTHAMNACEAE) (No. 3292), the "Resurrection" plant (see figure, p. 291); *Diplorrhynchus mossambicensis* Benth. (APOCYNACEAE) (No. 3297), a small tree with small, elliptic leaves, and divaricate, oblong, pointed fruiting carpels spotted with lenticels (Fig. 463). A very large-fruited *Combretum* proved to be *C. Zeyheri* Sond. (COMBRETACEAE) (No. 3300) (see figure, p. 463), and I was glad to at last see growing a species of the Oleaceous genus *Schrebera*, *S. trichoclada* Welw. (No. 3301), with elliptic leaves, pear-shaped, woody fruits and winged seeds. *Androstachys Johnsonii* Prain (EUPHORBIACEAE) (No. 3302), collected in the Zoutpansberg, was here quite common, but neither in flower nor fruit. Some of the trunks were quite 18 ins. in diameter. Numerous seedlings of this tree, called "Mzumbite", were observed, and regeneration was evidently very good. Other plants which caught one's eye from an ornamental point of view were a *Kalanchoe*, *K. thyrsiflora* Harv. (CRASSULACEAE) (No. 3306), quite 6 ft. high, with large, fleshy, obovate leaves and tiers of numerous yellow flowers, and *Podranea Brycei* (N.E. Br.) Sprague (No. 3307), a small Bignoniacious tree up to 15 ft. high, with deep-pink flowers, and very similar to the only other species of this genus which I collected at Port St. Johns (see figure, p. 254). It was in fruit as well as flower, the fruits being slender, and about 1 ft. long. Around the kopjes the dominant Caesalpineaceous tree, and very like a *Brachystegia*, was *Isoberlinia globiflora* (Benth.) Hutch. & B. Davy (No. 3295), whilst



[Photogr. : Mrs. A. Gillett.

The Cape to Cairo road, north of the Limpopo; a Baobab tree (*Adansonia digitata* L.), near the track.



[Photogr. : Mrs. Gillett.

Camp near Lundi River, Southern Rhodesia. General Smuts (*middle left*), his brother J. Smuts, and Mrs. Smuts (wife of General Smuts).



[Photogr. : Mrs. Gillett.]

Three of the botanists: (from left to right) the Author, Jan Gillett, and General Smuts, near the Lundi River; note the granitic hills in the background.

in moist places on the great boulders grew a pretty little Scrophulariaceous plant with reddish-purple leaves and blue flowers which has proved to be a new species of *Ilysanthes*, *I. purpurascens* Hutch.¹ The same species was collected by Eyles at Inyanga in 1919 and at Salisbury in 1931.

Plants collected at the Lundi River, S. Rhodesia, 30th June, 1930

LIGNOSAE (WOODY DICOTYLEDONS)

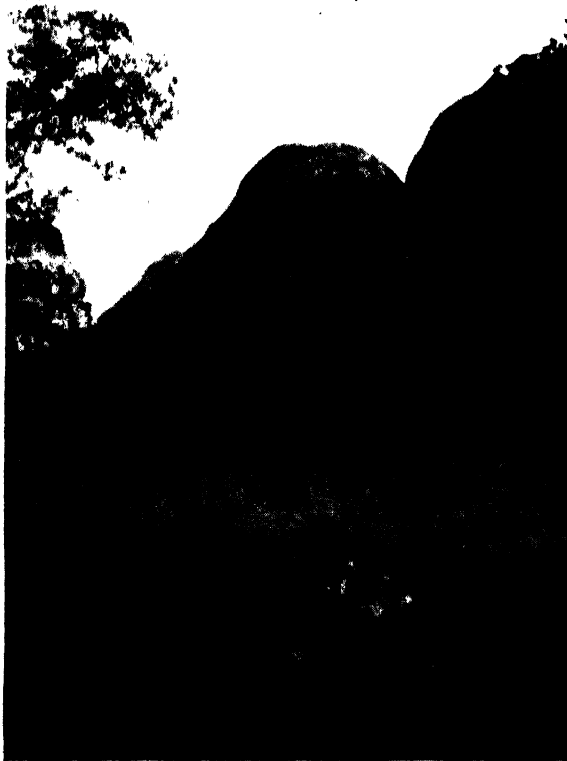
ANNONACEAE.—**Popowia obovata** Engl. & Diels (No. 3267): shrub; leaves obovate-elliptic, rounded at the apex, subcordate at the base; fruits torulose, 1-3-seeded.

¹ *Ilysanthes purpurascens* Hutch. sp. nov., affinis *I. pulchellae* Skan, sed fere ubique pilis brevibus retrorsis et foliis integris induta.

Herba caespitosa usque ad 10 cm. longa, nodis inferioribus radicans, ubique pilis brevibus reflexis induta et purpureo tincta; caules angulati. Folia sessilia, obovata vel spatulato-obovata, basi nervoso-carinata, apice obtusa, circiter 1 cm. longa et 5 mm. lata, integra, supra glabrescentia. Flores caerulei, axillares; pedicelli 1.5 cm. longi. Calyx 3 mm. longus, ad medium lobatus, lobis lanceolatis acutis. Corolla calyce duplo longior, labio superiori 2-lobato, inferiori 3-lobato. Capsula 7 mm. longa, 3 mm. diametro, glabra.

Southern Rhodesia: Kopjes near the Lundi River, in moist places on the granite boulders, flowers blue, 30th June, 1930, *Hutchinson and Gillett* 3269 (type in Kew Herbarium). Inyanga, 5000 ft., flowers blue, December 1919, *Eyles* 5185. Banks of Inseze, December 1929, *E. Cheesman* 98. Salisbury; in shallow soil on granite rock, 1st January, 1937, *Eyles* 8896; 26th December, 1931, *Eyles* 7072.

- CAESALPINIACEAE—*Isoberlinia globiflora* (Benth.) Hutch. & B. Davy (No. 3295): leaflets margined with soft short hairs. *Brachystegia reticulata* Hutch. & B. Davy (No. 3283): leaflets about a dozen pairs, small and narrow, reticulate, flowers in small panicles; stipules deciduous.
- PAPILIONACEAE—*Listia heterophylla* E. Mey. (No. 3274): very slender; leaflets variable in size, lanceolate; petals yellow, striate. *Crotalaria striata* DC. (No. 3298): flowers yellow; fruits pea-like with kidney-shaped shining yellow seeds. *Indigofera microcarpa* Desv. (No. 3256): semiprostrate; leaflets densely gland-dotted and covered with appressed medifixed hairs; flowers carmine-pink. *Sesbania aegyptiaca* Poir. (No. 3257): in river bed; wing-petals pale yellow, vexillum speckled outside. *Rhynchosia resinosa* Hochst. (No. 3310): leaflets ovate-rhomboid, densely glandular below; flowers yellow.
- MYROTHAMNACEAE—*Myrothamnus flabellifolia* Welw. (No. 3292) (see figure, p. 291).
- POLYGALACEAE—*Polygala Quartiniana* A. Rich. (No. 3286): slender herb with shortly linear pubescent leaves and short racemes of small reddish-pink flowers.



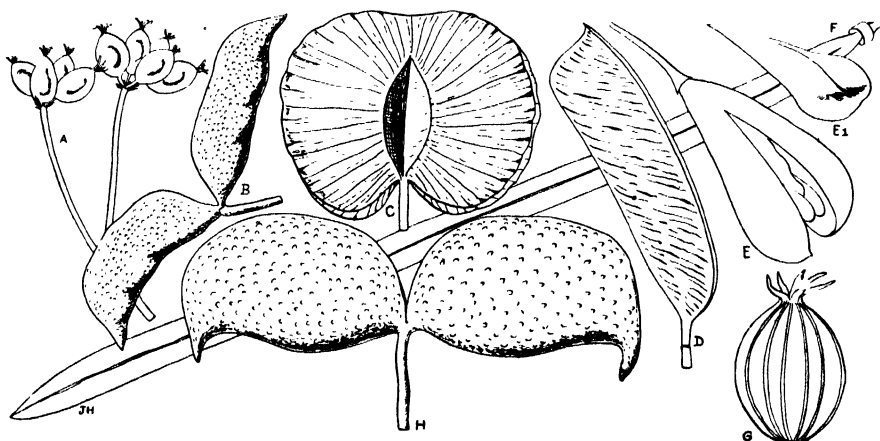
[Photogr. Mrs. Gillett.]

Kopjes north of the Lundi River.



(Photogr. : Mrs. Gillett.

The Lundi River, Southern Rhodesia.



Fruits of plants found at the Lundi River, Southern Rhodesia.

A, *Paederia foetens* (Hiern) K. Schum. (RUBIACEAE); B, *Diplorrhynchus mossambicensis* Benth. (APOCYNACEAE); C, *Combretum Zeyheri* Sond. (COMBRETACEAE); D, *Isobertlinia globiflora* (Benth.) Hutch. & B. Davy (CAESALPINIACEAE); E, *Schreberia trichoclada* Welw. with seed (E1) (OLEACEAE); F, *Podranea Brycei* (N.E. Br.) Sprague; G, *Gardenia spatulifolia* Stapf & Hutch. (RUBIACEAE); H, *Conopharyngia elegans* Stapf (APOCYNACEAE).

- TILIACEAE**—*Triumfetta pilosa* Roth (No. 3293): rank herb 4 ft. high, softly stellate-tomentose all over; fruits densely clustered in the leaf-axils, prickles pilose, ending in a hook.
- MALVACEAE**—*Hibiscus Kirkii* Mast. (No. 3309): softly tomentose all over, with pentagonal serrate leaves and shortly stalked yellow flowers.
- MALPIGHIACEAE**—*Sphedamnocarpus pruriens* Planch. (No. 3290): climber; leaves villous below with medifixed hairs; fruits winged.
- EUPHORBIACEAE**—*Pseudolachnostylis maprouneifolia* Pax (Nos. 3263, 3291): tree 20–25 ft.; leaves glaucous below; fruits globose, shining 2 cm. diam., slightly trilobed. *Croton pseudopulchellus* Pax (No. 3294): shrub 4 ft., growing in shade; leaves covered below with silver and brown peltate scales. *Androstachys Johnstonii* Prain (No. 3302) (see p. 459).
- COMBRETACEAE**—*Combretum Zeyheri* Sond. (No. 3300): tree 30–40 ft. (see figure, p. 463). *C. Gueinzii* Sond. (No. 3250): small tree; leaves elliptic, strongly reticulate and softly pubescent; fruits small, 1.5 cm. long, broadly elliptic, pubescent and scurfy. *Pteleopsis myrtifolia* Engl. & Diels (No. 3265): small tree; leaves oblong-elliptic, small, softly pubescent below; fruits oblong elliptic, cuspidate.
- CELASTRACEAE**—*Gymnosporia mossambicensis* Klotzsch (No. 3248): undershrub armed with slender thorns; fruits bright red.
- AMPELIDACEAE**—*Rhoicissus digitata* Gilg & Brandt (No. 3303): leaflets obliquely oblong, softly pubescent below.
- SAPINDACEAE**—*Cardiospermum Halicacabum* Linn. (No. 3253): climbing herb, with pinnate lobulate leaves and bladdery fruits.
- OLEACEAE**—*Schrebera trichoclada* Wedd. (No. 3301): tree 20 ft.; leaves opposite, elliptic, pubescent on the nerves below; fruits pear-shaped, woody; seeds winged (see figure, p. 463). *Jasminum mauritianum* Boj. (No. 3252) (see note, p. 459).
- APOCYNACEAE**—*Diplorrhynchus mossambicensis* Benth. (No. 3297): small tree; leaves oblong-elliptic; fruits (see figure, p. 463), obliquely oblong, pointed, speckled with lenticels. *Conopharyngia elegans* Stapf (No. 3268): small tree; fruits (see figure, p. 463), broadly oblong-ellipsoid, acute, warted. *Holarrhena febrifuga* Klotzsch (No. 3299): fruits elongate-linear; seeds with a tuft of long silky hairs at the top.
- ASCLEPIADACEAE**—*Cynanchum sarcostemmatoideis* K. Schum. (No. 3296): dwarf and creeping; leafless; stems slender, angular; flowers cream and white, in small clusters.
- RUBIACEAE**—*Gardenia spatulifolia* Stapf & Hutch. (No. 3249): leaves spatulate-obovate; fruits (see figure, p. 463) ellipsoid, strongly ribbed. *Crossopteryx febrifuga* Benth. (No. 3262): leaves elliptic, pubescent on the nerves; fruits in close cymes, subglobose, the size of a large pea. *Paederia foetens* (Hiern) K. Schum. (No. 3254): climber near the river; leaves broadly ovate, pubescent below, long-petiolate; fruits clustered in panicles, compressed, ovate, tipped by the style-like calyx-lobes.
- BIGNONIACEAE**—*Podranea Brycei* (N.E. Br.) Sprague (No. 3307) (see note, p. 459).
- VERBENACEAE**—*Vitex amboniensis* Gürke (No. 3304): shrub digitately 5-foliolate; leaflets broadly oblanceolate, softly pubescent below; fruits plum coloured on a plate-like calyx.

HERBACEAE (HERBACEOUS DICOTYLEDONS)

- RANUNCULACEAE**—*Clematis prostrata* Hutch. (No. 3255).
- POLYGONACEAE**—*Polygonum serrulatum* Lag. (No. 3260): stems and linear leaves red, the latter setulose on the margin; flowers red.
- AMARANTACEAE**—*Celosia trigyna* Linn. (No. 3287): widely spread weed with small clusters of white flowers.
- COMPOSITAE**—*Gynura cernua* Benth. (No. 3273): leaves rather coarsely dentate; heads discoid, deep pink. *Bidens Schimperii* Sch. Bip. (No. 3271): leaves much divided; flower-heads small, yellow; outer bracts linear. *Senecio fulgens* (Hook. f.) Nichols. (No. 3272): fleshy herb; leaves narrowly obovate, coarsely dentate; heads scarlet. *S. leprosa* S. Moore (No. 3259): 3 ft.; leaves linear, whitish-tomentellous below; flowers racemose, white. *S. multicorymbosus* Klatt (No. 3308): shrub; leaves elliptic-obovate, serrate, many-nerved; heads yellow, discoid, small in panicles. *Sphaeranthus*



View from Zimbabwe, Southern Rhodesia. [Photogr. by the Author.]

incisus Robyns (No. 3261) (see note, p. 459). ***Vernonia colorata*** (Willd.) Drake (No. 3247) (see p. 459). ***V. glabra*** Fatke (Nos. 3266, 3311): herb with small sessile oblong-lanceolate leaves and deep-mauve flower-heads. ***V. Steetziana*** Oliv. & Hiern (No. 3279): a graceful plant with linear leaves and numerous heads of blue flowers. ***Dicoma Kirkii*** Harv. (No. 3282) (see p. 459). ***Triplotaxis lundensis*** Hutch. new species¹ (No. 3270): slender annual, with linear-lanceolate denticulate leaves and deep mauve flower-heads, very like *Vernonia*, but pappus very short and comb-like.

CRASSULACEAE—***Kalanchoe thyrsiflora*** Harv. (No. 3306) (see p. 459). ***K. lanceolata*** Pers. (No. 3251): tall herb with thin leaves and softly pilose stems and inflorescence; corolla salmon.

SCROPHULARIACEAE—***Sopubia Welwitschii*** Engl. (No. 3281): fruits shortly pedicellate, ovoid, densely villous. ***Buchnera Henriquesii*** Engl. (Nos. 3275, 3277): leaves linear entire; flowers pale blue or purple-lilac, with a fairly large corolla-limb. ***B. hispida*** Buch.-Hamilt. (No. 3276): leaves linear-lanceolate, scabrid with bulbous-based hairs; flowers mauve lilac, with a very small corolla-limb. ***Ilysanthes purpurascens*** Hutch. n. sp. (No. 3269) (see p. 461). ***Diellis ovata*** Benth. (No. 3336): a weak spreading herb, with ovate coarsely toothed nearly glabrous leaves, and pale pink flowers with

¹ ***Triplotaxis lundensis*** Hutch. sp. nov.

Herba gracilis usque ad 0·5 m. alta; caules purpurascens, parce ramosi, albido-pubescentes. Folia oblanceolata, acuta, 3–4 cm. longa, 5–8 mm. lata, denticulata, brevissime pubescentia, nervis lateralibus inconspicuis. Capitula pauca, inaequaliter pedunculata, late campanulata, circiter 8 mm. diametro. Involucri bracteae circiter 3-seriatae, oblongo-lanceolatae, acuminatae, usque ad 6 mm. longae, superne viridescens. Flores pallide caerulei, exserti. Corolla extra glandulosa, 6 mm. longa. Achaenia 5-angulata, inter angulos leviter corrugata, pappo annulo brevissimo denticulato coronata.

Southern Rhodesia: Lundi River, flowers deep mauve, *Hutchinson & Gillett* 3270 (type in Kew Herbarium).

dark orange marks. *Nemesia affinis* Benth. (No. 3319): slender erect herb with ovate coarsely serrate leaves; flowers pale blue; capsule oblong, bilobed at the apex.

PEDALIACEAE—*Ceratotheca triloba* E. Mey. (No. 3268a): 3 ft. high; leaves broadly ovate-triangular, coarsely toothed, softly pilose; flowers mauve, with carmine stripes on the lower lip.

LABIATAE—*Tinnea zambesiaca* Baker (No. 3285) (see note, p. 459). *Pycnostachys urticifolia* Hook. (No. 3312) (see p. 467).

MONOCOTYLEDONS

LILIACEAE—*Eucomis zambesiaca* Baker (No. 3305): a soft-leaved herb about 1½ ft., with a rosette of broadly lanceolate leaves nearly 1 ft. long, and a stiff scape of numerous greenish flowers. *Asparagus stipulaceus* Lam. (No. 3288): branches slender, zigzag; shoots in fascicles; spines slender.

GRAMINEAE—*Leptocarydion vulpiastrum* Stapf (No. 3258): leaves oblong-ovate-lanceolate, rounded at the base; panicle spike-like, dense, like a fox's tail.

Late in the evening we arrived at the famous Zimbabwe ruins, and camped there for the night. It was rather wonderful to be sleeping on the ground almost in the shadow of these well-preserved relics, about which there has been so much controversy. I cannot claim to be an



[Photogr. by the Author.]

Zimbabwe ruins, Southern Rhodesia.

archaeologist, but I have seen a good deal of the Roman remains in my own county of Northumberland, and in comparison these ruins did not strike me as being at all ancient, a conclusion since arrived at by Miss Caton Thompson after extensive investigations. During the night there was a heavy dew and a slight frost. We thoroughly explored the ruins and collected a considerable number of specimens during the two days of our stay. A striking plant by the roadsides, and one we had added to our presses the previous day, was *Pycnostachys urticifolia* Hook. (LABIATAE), with dense spikes of beautiful sky-blue flowers and nettle-like leaves, and widely distributed from Tanganyika to Natal.



[Photogr. by the Author.]

A native woman and her family near Zimbabwe, Southern Rhodesia.

For the benefit of botanists visiting this spot about the same time of year, the plants gathered in flower are arranged in systematic order as follows :—

Plants Collected in and around the Zimbabwe Ruins, 1st–3rd July

LIVERWORT—*Targionia hypophylla* Linn. (No. 3345).

FILICES—*Ceterach cordatum* Desv. (No. 3331): fronds pinnately partite, lobes crenulate, covered below with acute lanceolate scales. *Doryopteris concolor* (L. & F.) Kuhn (No. 3330): fronds bipinnately partite, lobes narrowly oblong, the sori dense and continuous along the margin below. *Polypodium polypodioides* (L.) Watt. (No. 3342): small, leaves pinnately partite, the sori clustered below and covered with thin pointed scales.

LIGNOSAE (WOODY DICOTYLEDONS)

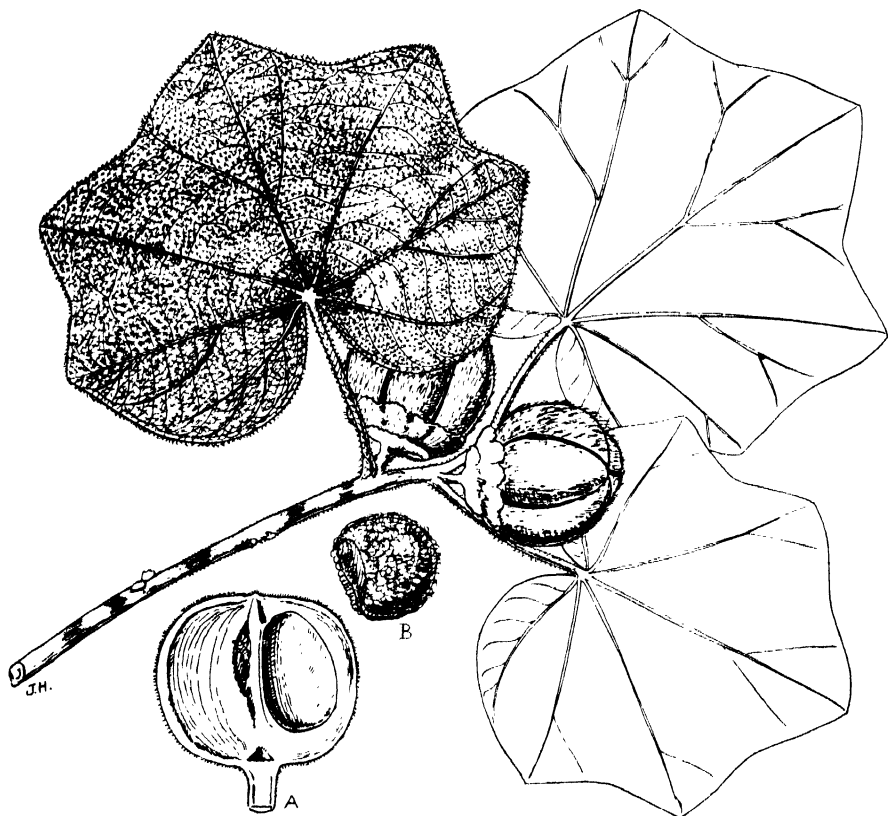
EBENACEAE—*Euclea divinorum* Hiern (No. 3328): on top of boulders near the ruins; shrub; leaves oblanceolate, undulate; flowers small, in short racemes towards the base of the shoots.

SAPOTACEAE—*Chrysophyllum magalismsontanum* Sond. (No. 3346) (see p. 308).

Mimusops Zeyheri Sond. (No. 3322) (see p. 305): large tree with long petiolate oblong-lanceolate leaves rounded at the tip, slightly rufous-pubescent below.

MIMOSACEAE—*Acacia pennata* Willd. (No. 3348): tree 20-30 ft.; leaves twice pinnate with numerous very small leaflets; fruits flat and thin, oblong, slightly puberulous, 15 cm. long, 3-4 cm. broad.

MORACEAE—*Ficus quibeba* Welw. ex Ficalho (No. 3326): large tree within the ruins; leaves large, about 30×15 cm., obovate-elliptic, with 5-6 pairs of lateral nerves.



Thespesia Rogersii S. Moore (MALVACEAE) from Zimbabwe.

A, vertical section of fruit; B, seed.

FLACOURTIACEAE—*Flacourtia hirtiuscula* Oliv. (No. 3332): small tree; leaves broadly elliptic to suborbicular, crenate; fruits small, hard, lobulate.

STERCULIACEAE—*Dombeya rosea* Bak. f. (No. 3320): small tree, with cordate, rounded-pentagonal leaves loosely covered with stellate hairs, and long-pedunculate umbel-like cymes of white flowers.

MALVACEAE—*Thespesia Rogersii* S. Moore (No. 3347): small tree covered with stellate hairs; leaves pentagonal, shortly 5-lobed, cordate at the base; fruits ovoid-globose, hispid, fibrous inside; seeds softly villous.

CELASTRACEAE—*Gymnosporia senegalensis* Lam. (No. 3324): shrub; leaves glaucous, narrowly obovate, subentire; flowers numerous in small axillary cymes, pale cream. *G. undatus* (Thunb.) Loes. (No. 3327): shrub; leaves obovate, cuneate at the base, obtusely dentate; fruits opening into 3 boat-shaped valves.

- RUTACEAE—**Teclea Welwitschii** (Hiern) Verdoorn (No. 3321): tree; leaflets 3, large, narrowly obovate, with numerous lateral nerves and gland-dotted.
- MELIACEAE—**Turraea floribunda** Harv. (No. 3351): small tree; leaves simple, ovate, acuminate, pilose on the nerves below; fruit sessile, depressed-globose, 10-angled.

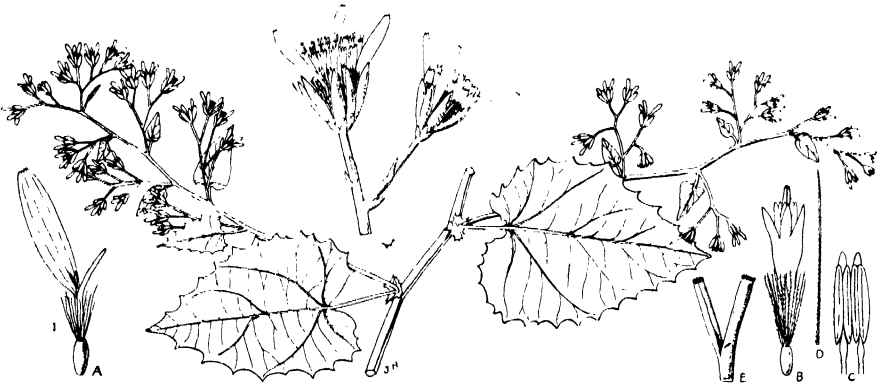
HERBACEAE (HERBACEOUS DICOTYLEDONS)

- CARYOPHYLLACEAE—**Silene capensis** Otto (No. 3338): herb, puberulous all over; leaves lanceolate, acute; calyx viscid; petals dull brick-red and cream.
- FICOIDACEAE—**Delosperma Mahoni** (N.E. Br.) N.E. Br.: procumbent and shortly pubescent; leaves linear; flowers white or pink; on rocks.
- POLYGONACEAE—**Rumex sagittatus** Thunb. (No. 3323): weak straggling herb; leaves sagittate; enlarged sepals orbicular, red.
- AMARANTACEAE—**Cyathula cylindrica** Moquin (No. 3317): leaves opposite, ovate-rounded, pubescent; flower-heads white, with slender hooked bristles.
- LYTHRACEAE—**Nesaea cordata** Hiern (No. 3350): a very small herb in damp places at edge of boulders, with *Sporobolus*; leaves narrowly oblong, cordate at the base; flowers in axillary clusters, carmine pink.
- LOBELIACEAE—**Lobelia fervens** Thunb. (No. 3333): slender herb, glabrous or puberulous, with linear to elliptic slightly crenate leaves and blue flowers on slender pedicels.
- COMPOSITAE—**Vernonia cistifolia** O. Hoffm. (No. 3315): 4–5 ft.; leaves lanceolate, scabrid above, woolly below; heads deep mauve, in dense corymbs. **Gnaphalium purpureum** Linn. (No. 3340): woody herb with spathulate entire leaves, white woolly below; heads clustered into an oblong spike. **Helichrysum Kraussii** Sch. Bip. (No. 3352): small shrublet among grass; branches softly tomentellous; leaves small, linear, with recurved margins, woolly below; heads small, glomerate, pale straw-coloured. **Senecio deltoideus** Less. (No. 3318): straggling; leaves ovate-deltoid, widely cordate at the base, coarsely dentate; heads yellow in leafy divaricately branched panicles. **Senecio paucifolius** DC. (No. 3325): herb with basal obovate subentire leaves and slender peduncles bearing up to 3 small heads with small yellow rays. **Gynura crepidioides** Benth. (No. 3335): herb to 2 ft. high; leaves pinnately partite; heads discoid, red carmine.
- CRASSULACEAE—**Kalanchoe zimbabwensis** Rendle (No. 3344): up to 1 ft. high, softly pubescent all over; leaves elliptic, crenate; flowers orange in a small dense cyme. **K. Holstii** Engl. (No. 3343): slender, with small glabrous leaves and loose cymes of brick red flowers.
- CONVOLVULACEAE—**Dichondra repens** Forst. (No. 3341): procumbent herb with kidney-shaped pubescent leaves, growing at base of rocks. **Convolvulus farinosus** Linn. (No. 3337): procumbent; leaves triangular, sagittate; flowers few together on a longish peduncle, pale pink.
- SCROPHULARIACEAE—**Nemesia affinis** Benth. (No. 3319): herb 1 ft. high; leaves opposite, petiolate, ovate, serrate; flowers pale blue. **Diclis ovata** Benth. (No. 3336): small weak herb with broadly ovate serrate leaves, and small pale pink flowers with dark orange marks.
- ACANTHACEAE—**Hypoestes antennifer** S. Moore (No. 3314): 3 ft. high; leaves broadly ovate, softly pubescent on the nerves below; flowers densely verticillate, deep pink with carmine spots.
- LABIATAE—**Plectranthus myrianthus** Briq. (No. 3316): herb 2 ft.; leaves long-petiolate, broadly ovate, coarsely and obtusely serrate, shortly pubescent on the nerves; flowers sky-blue in narrow panicles with short secund branches. **Aeolanthus nyassae** Gürke (No. 3334): few woolly leaves; flowers pink, scented, the axis with persistent disk-like scars.

MONOCOTYLEDONS

- CANNACEAE—**Canna bidentata** Bertol. (No. 3329): growing amongst the ruins; leaves elliptic; flowers red; ovary warted.
- GRAMINEAE—**Sacciolepis huillensis** (Rendle) Stapf (No. 3349): dwarf annual grass, with narrow solitary stem-leaves, and short spikes of strongly nerved spikelets.

Before leaving the district we made an excursion a few miles to the eastwards¹ from Zimbabwe, among the more interesting plants being *Osteospermum moniliferum* L. (No. 3375), a Composite widely spread from Cape Point to Abyssinia; *Protea leucoblepharis* Baker (PROTEACEAE) (No. 3377), a tree 20 ft., with beautiful heads of pinkish-white flowers. A striking, fleshy Euphorbiaceous shrub, 10 ft. high, which my South African companions were chary of handling because of its poisonous properties, was *Synadenium Kirkii* N.E. Br. (No. 3373). No. 3374, on which I lost sixpence to Pole Evans as to its identity, proved to be, as he said, *Burkea africana* Hook. (CAESALPINIACEAE), a small tree, 15-20 ft. A handsome *Vernonia*, 7 ft. high, with large panicles of deep-mauve flowers, I have determined to be *V. cistifolia* O. Hoffm. (No. 3378).



Senecio deltoideus Less. (COMPOSITAE), from Zimbabwe, Rhodesia.

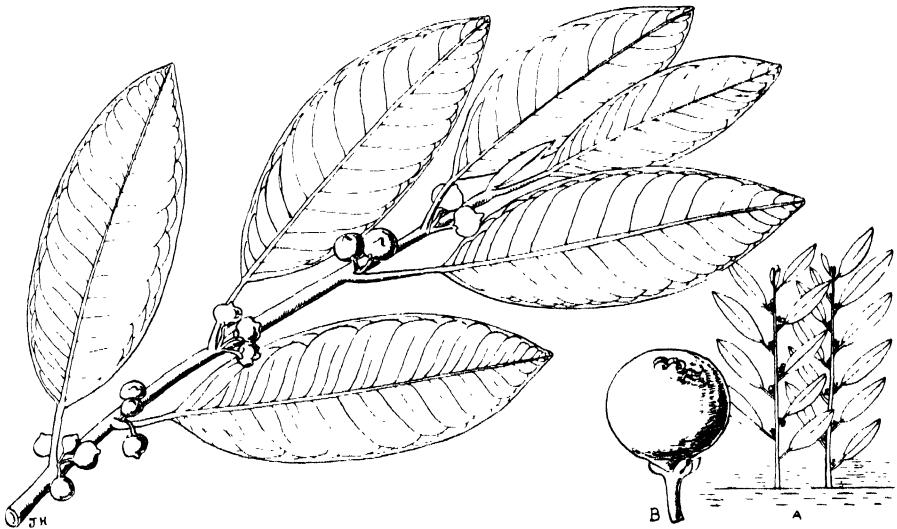
A, ray flower; B, disk flower; C, stamens; D, pappus bristle; E, style-arms.

By the side of a stream were several interesting and quite ornamental plants, including *Dissotis princeps* Triana (MELASTOMACEAE) (No. 3381), 4-5 ft. high, with broadly lanceolate, densely pubescent leaves; *Pentas purpurea* Oliv. (Rubiaceae) (No. 3384), 3 ft. high, with lanceolate scabrid leaves and dense cymes of deep-mauve flowers;

¹ Also collected: No. 3353, *Crotalaria lachnocarpoides* Engl. (PAPILIONACEAE); 3354, *Micromeria biflora* Benth. (LABIATAE); 3355, *Cheilanthes hirta* Sw. (FILICES); 3356, *Crassula nodulosa* Schubl. (CRASSULACEAE); 3357, *Odenlandia Heynei* Oliv. (RUBIACEAE); 3358, *Lefeburia brachystyla* Hiern (UMBELLIFERAE); 3359, *Vernonia glabra* Vatke (COMPOSITAE); 3360, *Maesa lanceolata* Forssk. (MYRSINACEAE); 3361, *Peristrophe bicalyculata* Nees (ACANTHACEAE); 3362, *Hypoestes verticillaris* R. Br. (ACANTHACEAE); 3363, *Anemia Schimperiana* Presl. (FILICES); 3365, *Brachylaena rhodesiana* S. Moore (COMPOSITAE); 3366, *Cyathula cylindrica* Moquin (AMARANTACEAE); 3367, *Laggera alata* Sch. Bip. (COMPOSITAE); 3368, *Gardenia asperula* Stapf & Hutch. (RUBIACEAE); 3369, *Temnocalyx obovatus* (N.E. Br.) Robyns (RUBIACEAE); 3370, *Ficus natalensis* Hochst. (MORACEAE); 3371, *Schistostephium crataegifolium* Fenzl. (COMPOSITAE); 3372, *Cassia Petersiana* C. Bolle (CAESALPINIACEAE); 3376, *Phytolacca dodecandra* L'Hérit. (PHYTOLACCACEAE); 3379, *Inula glomerata* Oliv. & Hiern (RUBIACEAE); 3380, *Cynoglossum lanceolatum* Forssk. (BORAGINACEAE); 3382, *Sopubia Dregeana* Benth. (SCROPHULARIACEAE); 3383, *Loranthus kulachariensis* Schinz (LORANTHACEAE); 3386, *Pavonia Meyeri* Mast. (MALVACEAE); 3390, *Barleria crassa* C.B. Cl. (ACANTHACEAE); 3392, *Notonia petraea* R.E. Fries (COMPOSITAE); 3393, *Lycopodium cernuum* Linn.

Helichrysum Kirkii Oliv. & Hiern (COMPOSITAE) (No. 3385), about 1 ft. high, woolly all over except the golden-yellow flower-heads, 2-3 together; leaves lanceolate, amplexicaul; *Plectranthus myrianthus* Briq. (LABIATAE) (No. 3387), 3 ft. high, rather small, ovate, densely glandular leaves and narrow, oblong panicles of deep-blue flowers borne on crowded, short side branches (apparently the same as No. 3316, see p. 469).

Growing in the running water was a dwarf species of fig, *Ficus verruculosa* Welw. (MORACEAE) (No. 3391), with simple stems, oblong-elliptic leaves, and clusters of shortly pedunculate figs about the size of a pea; *Limnanthemum Thunbergianum* Griseb. (GENTIANACEAE) (No.



Ficus verruculosa Welw. (MORACEAE), an aquatic species near Zimbabwe.

A, shows habit; B, fig.

3388), with rounded, deeply cordate leaves and a few flowers just below the leafblade; also *Nymphaea calliantha* Conard (NYPHAEACEAE) (No. 3389), with flowers of a pale, washed-out blue.

Early on the morning of 3rd July we left Zimbabwe by a rather bad road for Umvuma, and reached Gwelo about midday. We passed through much *Combretum* and *Acacia* bush, and 9 miles north-west of Umvuma collected two species of *Brachystegia*: *B. spiciformis* Benth. (No. 3394), and *B. filiformis* Hutch. & B. Davy (No. 3395), the former with the few pairs of leaflets increasing in size upwards and pubescent on the midrib; flowers in short, dense, spike-like racemes; the latter with about fifteen pairs of oblong, deeply emarginate leaflets, gradually decreasing upwards, and flat-margined fruit valves covered with flaky scales.

Thirteen miles east of Gwelo ¹ two Lorantheous parasites were conspicuous: *Viscum verrucosum* Harv. (No. 3396), and *Loranthus*

¹ Also collected: No. 3398, *Kalanchoe lanceolata* Pers. (CRASSULACEAE); 3399, *Rhus kwebensis* N.E. Br. (ANACARDIACEAE); 3400, *Hartogia capensis* Thunb. (CELASTRACEAE); 3401, *Euclea lanceolata* E. Mey. (EBENACEAE).

oleifolius var. *Leendertziae* Sprague (No. 3397), the latter with small elliptic leaves and axillary clusters of densely hirsute, pale brick-red flowers. Beyond Gwelo the country for about 50 miles or so was mostly of the high-veld type, undulating long-grass country with a few trees at considerable intervals. *Clematopsis Stanleyi* (Hook. f.) Hutch. was everywhere conspicuous in fruit (see figure, p. 381).

Our camp was by the Shangani River¹ among a dense stand of spiny species of *Acacia*. We found the night very cold, with four degrees of frost, and it was a chilly job at daybreak transferring our partly dried plants to thin papers, ready for making into parcels for despatch from Bulawayo to Pretoria, where the drying was to be completed. Our presses were quite full, and I looked forward to getting rid of the plants already collected at Bulawayo, for it was no light task to contrive to have enough paper dried each evening for the next day's collection. For this purpose we often lighted a separate fire—the “botanical fire”—to be out of the way of cooking. This fire was very popular, for it provided seats on the plant-presses for most of the party, some of whom not infrequently entertained the others with gruesome stories, mainly about lions. However, as I was fast becoming a seasoned African traveller, these did not worry me unduly, though we were sleeping on the open veld each night with no protection other than our blankets.

This particular morning we did not finish our task until 10.30, when we followed the trail of the remainder of the party to Bulawayo as fast as we could travel. This part of the route was through rather poor and somewhat uninteresting country, the road running parallel with the railway through rough grass-veld for most of the way.

We left Bulawayo soon after midday, much precious time being saved by a friendly store-keeper offering to pack our nine parcels of specimens and despatch them by rail to Pretoria. The road from Bulawayo was quite good as far as Lonely Mine, the veld being mostly covered with *Combretum* and *Acacia*, very like the bushveld of the Northern Transvaal. At 25 miles we collected two species of the latter, *A. campylacantha* Hochst. (MIMOSACEAE) (No. 3407), with very numerous small leaflets and narrow, flat, puberulous pods, and *A. Karroo* Hayne (No. 3408), with fewer leaflets and slender, torulose pods. After leaving Lonely Mine we passed through “Mopane” forest glowing with autumnal tints, accentuated by the setting sun facing us to the north-west.

About 30 miles beyond Lonely Mine, and in Dett Valley, we at last found a suitable camp in a picturesque spot at the edge of the “Mopane” forest, with a wide vista of tall brown grass in front of us (see photograph, p. 474)—a typical African setting—and it needed only a lion or two and a few giraffes to bring to life many a picture seen at home. Our camp-fires were lighted in the midst of a grove of beautiful little trees, which proved to be *Monotes glaber* Sprague (No. 3409), a member of an interesting Dipterocarpaceous genus, and one General Smuts was keenly anxious to see. This and the very closely related

¹ Collected here: No. 3402, *Loranthus kalachariensis* Schinz. (LORANTHACEAE); 3403, *Lasiosiphon Kraussianus* Meisn. (THYMELAEACEAE) (see figure, p. 281); 3404, *Asparagus racemosus* Willd. (LILIACEAE); 3405, *Clematopsis Stanleyi* (Hook. f.) Hutch. (see figure, p. 381); 3406, *Schrebera* sp. near *S. Saundersiae* Harv. (OLEACEAE)—in leaf only.

Marquesia are the only genera of this family occurring in Africa, the others all belonging to the tropics of Indo-Malaya. We were here right in the heart of Africa, and during most of the night we could hear the tom-toms from a village across the valley.

5th July, a Saturday, proved to be almost entirely a motoring day, and a hard day it was, the road being very bad, and passing through sandy vleis and rough "Mopane" forest. I was driving a Chevrolet car, and we were unfortunate in the matter of punctures, for it was a hot and tiresome job to mend them in such a high temperature. As it happened, there appeared little to collect, but near Dett the sight of a beautiful blue-flowered Acanthaceous plant brought the car to a standstill. It has since been described by Miss Obermeijer as a new species, *Barleria lateralis* Obermeijer (No. 3410), and there was only a small patch of it seen in an otherwise long, flowerless stretch of country.

Our rendezvous that night was to have been at the Wankie Coal Mine, but fortunately we were compelled, through the approach of darkness, to stop short of that rather dreary place, and we camped out near a dried-up river bed. The stretch of road over the Mica Hill was the worst I have ever experienced in a motor, and we were very relieved when Dr. Pole Evans, who had failed to reach camp the previous night, now appeared, having covered 190 miles in the day to catch us up, a noteworthy drive over such atrocious roads.

The Victoria Falls

In the afternoon of the next day (6th July) we arrived at the Victoria Falls. The visitor to Africa from Europe, with the grandeur of the Alps and the Pyrenees and the soft charm of the English lakes close at hand, is apt to find some of the scenery a little overrated by South African journalists. This, however, was not the case with the Victoria Falls. They were all, and even more, than I had ever pictured them, and not in the least exaggerated in any account I had read.

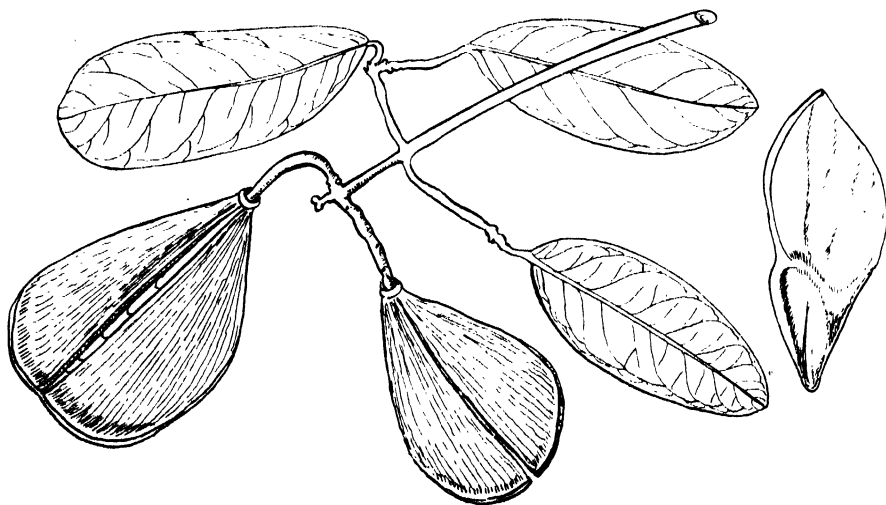
The administration of Northern Rhodesia had kindly arranged for us to camp on a beautiful site on the northern bank of the river, about a mile above the Falls. This was a delightful spot, and we stayed there for four nights.

Mr. Pardy, District Forest Officer, accompanied us on our botanical excursions in the neighbourhood, and was of great assistance as a guide, whilst the Curator of the Falls gave us every help. First of all we collected in the vicinity of our camp, a mile above the falls. A tall tree over our camp, 50–60 ft. high, was *Diospyros mespiliformis* Hochst. (EBENACEAE) (No. 3411), with oblong, finely nerved leaves and globose fruits about 2 cm. diam. Close by the river, and climbing over bushes, was a pretty and widely distributed *Jasminum*, *J. mauritianum* Bojer (No. 3412), with trifoliolate, softly pubescent leaves, and white corollas, dull red outside the tube. Climbing on the lower branches of the *Diospyros* was a *Hippocratea*, *H. obtusifolia* Roxb. (HIPPOCRATEACEAE) (No. 3413), with small, glaucous-green, oblong leaves, compressed, 2-lobed fruits, closely nerved, and obliquely-winged seeds (see figure, p. 474). A common species of *Salix*, 18–20 ft. high, was *S. suberrata* Willd. (SALICACEAE) (No. 3414), an older name now to be used for *S. Salsaf*



(Photogr. : Mrs. Gillett.

View from our camp in Dett Valley, Southern Rhodesia.



Leaves, fruit and seed of *Hippocratea obtusifolia* Roxb. (HIPPOCRATEACEAE),
from the banks of the Zambesi above the Victoria Falls.



Camp in early morning near Victoria Falls ; General Smuts near the car.



[Photographs by the Author.]

The Zambesi from above the Victoria Falls.

Forssk., and growing on it *Loranthus oleifolius* Cham. & Schlecht. (LORANTHACEAE) (No. 3415), with a red tube and green limb.

Growing in the shade of the *Diospyros* was a *Croton* I had long known in the herbarium, *C. zambesiacus* Müll. Arg. (EUPHORBIACEAE) (No. 3416), with long-petiolate, oblong-lanceolate leaves covered with silvery scales below; and near the river-bank grew tall shrubs of another genus I had "wrestled" with for the *Flora of Tropical Africa*, a *Bridelia*, *B. cathartica* Bertol. f. (EUPHORBIACEAE) (No. 3417), with elliptic leaves and small, blue-black, two-celled fruits. Conspicuous on the river bank were young plants of *Garcinia Livingstonei* T. Ands., with angular stems and opposite leaves (not collected), and what I took to be the common *Phragmites*, but it proved a different species, *P. mauritianus* Kunth (GRAMINEAE) (No. 3422a), and a *Syzygium*, *S. guineense* (MYRTACEAE) (No. 3423). A few other less conspicuous species collected are enumerated below.¹

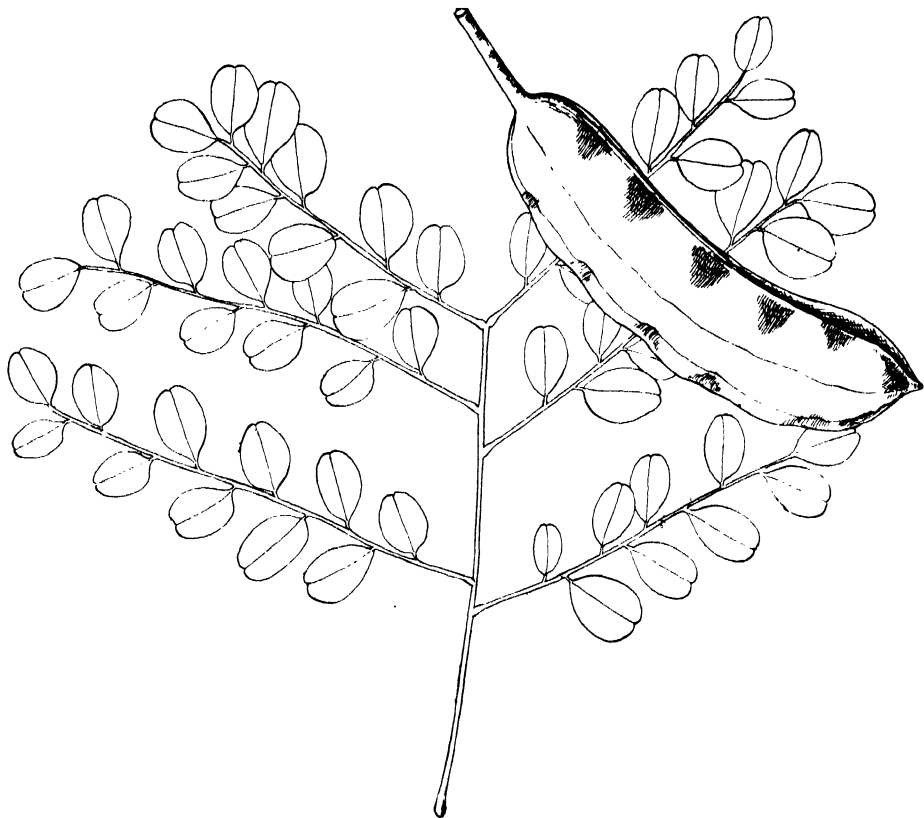
The most striking of the few plants in flower in the vicinity² of the Falls were the low-growing *Clerodendron spinescens* Gürke (VERBENACEAE) (No. 3426), with softly pubescent, ovate leaves, recurved axillary thorns, and axillary scarlet flowers. Two large, shady trees near the railway station were *Ambylogonocarpus obtusangulus* Harms (MIMOSACEAE) (No. 3427), with bipinnate leaves, broadly elliptic leaflets, and pendulous, banana-shaped, stipitate fruits (see figure, p. 477), and *Copaifera coleosperma* Benth. (CAESALPINIACEAE) (No. 3430), with twin, obliquely ovate, bluntly pointed leaflets, and small, kidney-shaped, flat fruits. Another leguminous tree with a valuable timber was also growing here, *Baikaea plurijuga* Harms (CAESALPINIACEAE) (No. 3431), with simply pinnate leaves, oblong, pubescent leaflets, and scimitar-shaped, flat, ferruginous fruits. A striking *Combretum* with large, elliptic, rust-covered fruits and oblong-elliptic leaves, densely lepidote below, proved to be *C. Mechowianum* O. Hoffm. (COMBRETACEAE) (No. 3428). Another leguminous tree very familiar to me in collections from various parts of tropical Africa was *Swartzia madagascariensis* Desv. (No. 3507), with cylindric, sausage-like fruits (see figure, p. 479).

The Victoria Falls "Rain-Forest"

One whole morning was devoted to making a collection in the so-called "rain-forest" at the Falls, an artificial, almost continuously moist area, due to the spray. I was very interested to find out the identity of the species growing within the influence of the spray, and to see whether they were the same, or whether they differed materially from those of the "gallery" forest lining the rivers throughout Rhodesia. On the whole they were much the same.

¹ Also collected 1 mile above the Falls: No. 3418, *Gardenia resiniflua* Hiern (RUBIACEAE); 3419, *Combretum elaeagnoides* Klotzsch (COMBRETACEAE); 3420, *Tacazzea Kirkii* N.E. Br. (ASCLEPIADACEAE); 3421, *Strychnos Stuhlmannii* Gilg (LOGANIACEAE); 3422, *Gymnosporia senegalensis* (Lam.) Loes. (CELASTRACEAE); 3424, *Pleurostylia africana* Loes. (CELASTRACEAE).

² Also collected near the Falls: No. 3425, *Euphorbia* sp. (EUPHORBIACEAE); 3429, *Diospyros batokana* Hiern (EBENACEAE); 3432, *Albizia Antunesiana* Harms (MIMOSACEAE); 3433, *Sesbania aegyptiaca* Poir. (PAPILIONACEAE); 3470, *Bolusanthus speciosus* Harms (CAESALPINIACEAE).



Ambylogonocarpus obtusangulus Harms (CAESALPINIACEAE), a large tree at the Victoria Falls.

The plants we found in the "rain-forest" are set out below, and comments as to distribution follow some species :—

Plants Collected in the Rain Forest at the Victoria Falls

FILICES—*Adiantum Capillus-veneris* Linn. (No. 3444): the common Maiden-hair fern. *Cheilanthes farinosa* (Forssk.) Kze. (No. 3459): fronds simply pinnate, leaflets pinnatipartite, with pale yellow meal below, with the sori along the margins. *Dryopteris dentata* (Forssk.) C. Chr. (No. 3458): fronds pinnate; segments pinnately lobed to the middle, acuminate.

LIGNOSAE (WOODY DICOTYLEDONS)

PAPILIONACEAE—*Desmodium salicifolium* DC. (No. 3455): slender shrub with trifoliate leaves, and stipellate narrowly lanceolate leaflets; fruits curved, breaking up into 1-seeded segments.

MORACEAE—*Ficus ingens* Miq. (No. 3454): small tree; leaves ovate-elliptic, cordate at the base; figs small, globose, pedunculate, glabrous. Very widely spread in tropical and South Africa. *Ficus Burkel* Miq. (No. 3457): tree growing on side of gorge; leaves oblong-oblancoelate; figs shortly pedunculate, small, densely tomentose. *F. gongoensis* De Wild. (No. 3467): tree; leaves ovate-elliptic, entire or widely dentate; figs in a

panicle on the main trunk, woolly-tomentose. Known only from the Belgian Congo. I am not quite certain as to this determination, my material being rather inadequate.

FLACOURTIACEAE—**Flacourtia Ramontchi** *L'Hérit.* (No. 3465): shrub with obovate-elliptic crenate leaves and small globose fruits. Very widely distributed.

EUPHORBIACEAE—**Phyllanthus Niruri** *Linn.* (No. 3441): herb; leaves small, oblong-elliptic; flowers unisexual, males 2-3 together, females solitary; capsule depressed-globose.

AMPELIDACEAE—**Cissus congesta** (*Bak.*) *Planch.* (No. 3464): climber with subsessile digitate leaves and open cymes of small flowers and fruits.

APOCYNACEAE—**Strophanthus** sp. (No. 3468): twiner; leaves broadly ovate, large, shortly pubescent on the nerves below; fruits lanceolate, full of long silky hairs topping the seeds.

RUBIACEAE—**Oldenlandia corymbosa** *L.* (No. 3437): weak, much branched herb with linear-lanceolate leaves and solitary or cymulose axillary flowers. **Pavetta cataractarum** *S. Moore* (No. 3461): shrub 6 ft., in fruit; leaves obovate, softly pubescent below; fruits globose, shining, 1 cm. diam., tipped with the persistent hairy calyx. **Feretia aeruginescens** *Stapf* (No. 3466): shrub; fruits sessile, globose, 2 cm. diam., fleshy, bright red.

HERBACEAE (HERBACEOUS DICOTYLEDONS)

RANUNCULACEAE—**Clematis simensis** *Fres.* (No. 3460): climber with ovate coarsely serrate leaflets glabrous below; carpels with plumose tails. Widely distributed.

LYTHRACEAE—**Nesaea floribunda** *Sond.* (No. 3452): herb with opposite oblong-lanceolate leaves, and pedunculate heads of carmine flowers.

GENTIANACEAE—**Sebaea Barbeyana** *Schinz* (No. 3438): herb up to 15 cm. high; leaves sessile, ovate, obtuse; flowers yellow. First collected on the island above the Falls by Kirk, and known also from the bed of the White Nosob River in South West Africa. **Canscora Kirkii** *N.E. Br.* (No. 3439): slender herb with narrowly 4-winged stems, obovate-elliptic 3-nerved leaves and panicles of small pink flowers.

LOBELIACEAE—**Lobelia Melleri** *Hemsl.* (No. 3436): a weak straggling herb, the lower leaves ovate-elliptic, crenulate, the upper linear; flowers blue.

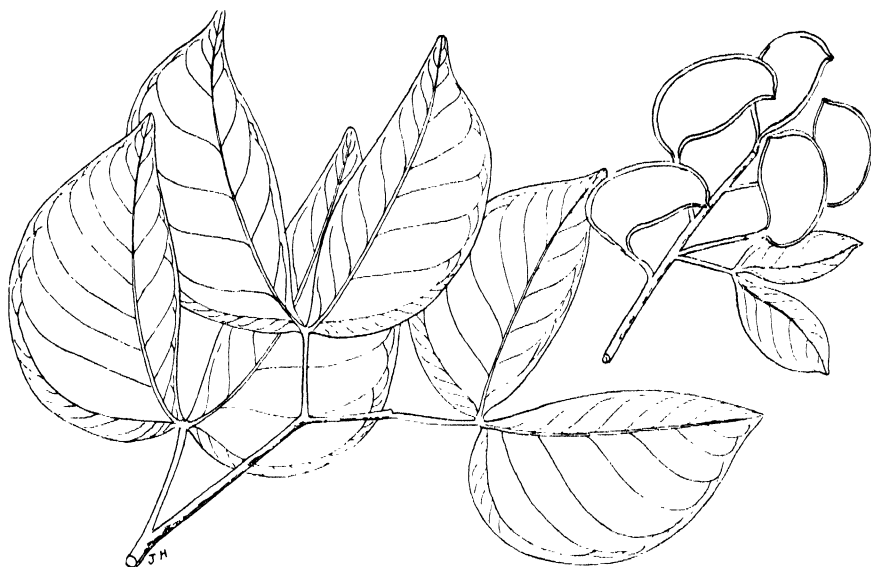
COMPOSITAE—**Vernonia cinerea** *Less.* (No. 3434): herb 2 ft. with scabrid lanceolate leaves and corymbs of small mauve-purple flower-heads. **V. colorata** *Drake* (No. 3450): shrub up to 14 ft.; leaves entire, broadly lanceolate, glandular and slightly pubescent below; heads small, corymbose, with ciliate bracts. Widely distributed in tropical Africa. **V. Petersii** *Oliv. & Hiern* (No. 3456): scraggy herb; involucre woolly; flowers crimson. **Gynura vitellina** *Benth.* (No. 3443): 2½ ft. high; leaves broadly lanceolate, coarsely toothed; heads pale carmine, on slender peduncles. **Emilia protracta** *S. Moore* (No. 3445): forming colonies in direct spray of Falls on margin of rain-forest; stems prostrate; heads carmine. **Blumea lacera** *DC.* (No. 3453): herb with oblanceolate jagged-margined leaves, and oblong inflorescences of deep pink flower-heads. **Adenostemma Dregei** *DC.* (No. 3446): slender herb; leaves ovate-lanceolate, cuneate at the base, crenate; flower-heads paniculate, on slender pedicels; achenes densely warted.

CONVOLVULACEAE—**Ipomoea palmata** *Forssk.* (No. 3435): straggler; leaves digitately divided into 7 narrow segments; flowers axillary, solitary, pedicellate, mauve.

SCROPHULARIACEAE—**Diels petiolaris** *Benth.* (No. 3442): a small herb; leaves long-petiolate, ovate, slightly dentate; flowers very small on long thread-like pedicels.

ACANTHACEAE—**Phayloopsis imbricata** (*Forssk.*) *Sweet* (No. 3449): a straggly herb, with long-petiolate ovate leaves and sessile spikes of creamy-white flowers subtended by leafy ovate strigose bracts. **Blepharis boerhaaviifolia** *Pers.* (No. 3451): divaricate herb, with pubescent branches; leaves whorled, narrowly obovate; bracts pectinate; flowers white.

LABIATAE—**Iboza riparia** (*Hochst.*) *N.E. Br.* (No. 3448): leaves long-petiolate, broadly ovate, crenate-dentate, slightly pubescent on the nerves below; flowers small, white or pink, in axillary panicles.



Copaifera coleosperma Benth. (CAESALPINIACEAE), a large tree at the Victoria Falls.



Swartzia madagascariensis Desv. (PAPILIONACEAE), from the Victoria Falls.

A, flowering shoot; B, flower; C, stamen; D, longitudinal section of ovary; E, fruiting shoot; F, cross section of ovary; G, seed.

MONOCOTYLEDONS

- ERIOCAULACEAE—*Eriocaulon subulatum* N.E. Br. (No. 3447): only found at the Falls; very dwarf; heads on peduncles as long as the leaves, very small.
- CYPERACEAE—*Fuirena umbellata* Rottb. (No. 3463): 1½–2 ft.; leaves with long amplexicaul sheaths, pale glaucous; flowers in hairy sessile or pedunculate clusters.
- GRAMINEAE—*Opilsmenus hirtellus* (L.) Beauv. (No. 3440): culms slender and rooting at the lower nodes; leaf-blades lanceolate, very acutely acuminate; rhachis of the lateral spikes with long slender hairs. *Ischaemum purpurascens* Stapf (No. 3462): culms slender, rooting at the lower nodes; leaf-blades linear, acute; inflorescence spiciform, on a slender peduncle.

An afternoon was spent botanising in the *Brachystegia* forest some distance from the Falls along the Bulawayo road and the following plants collected :—

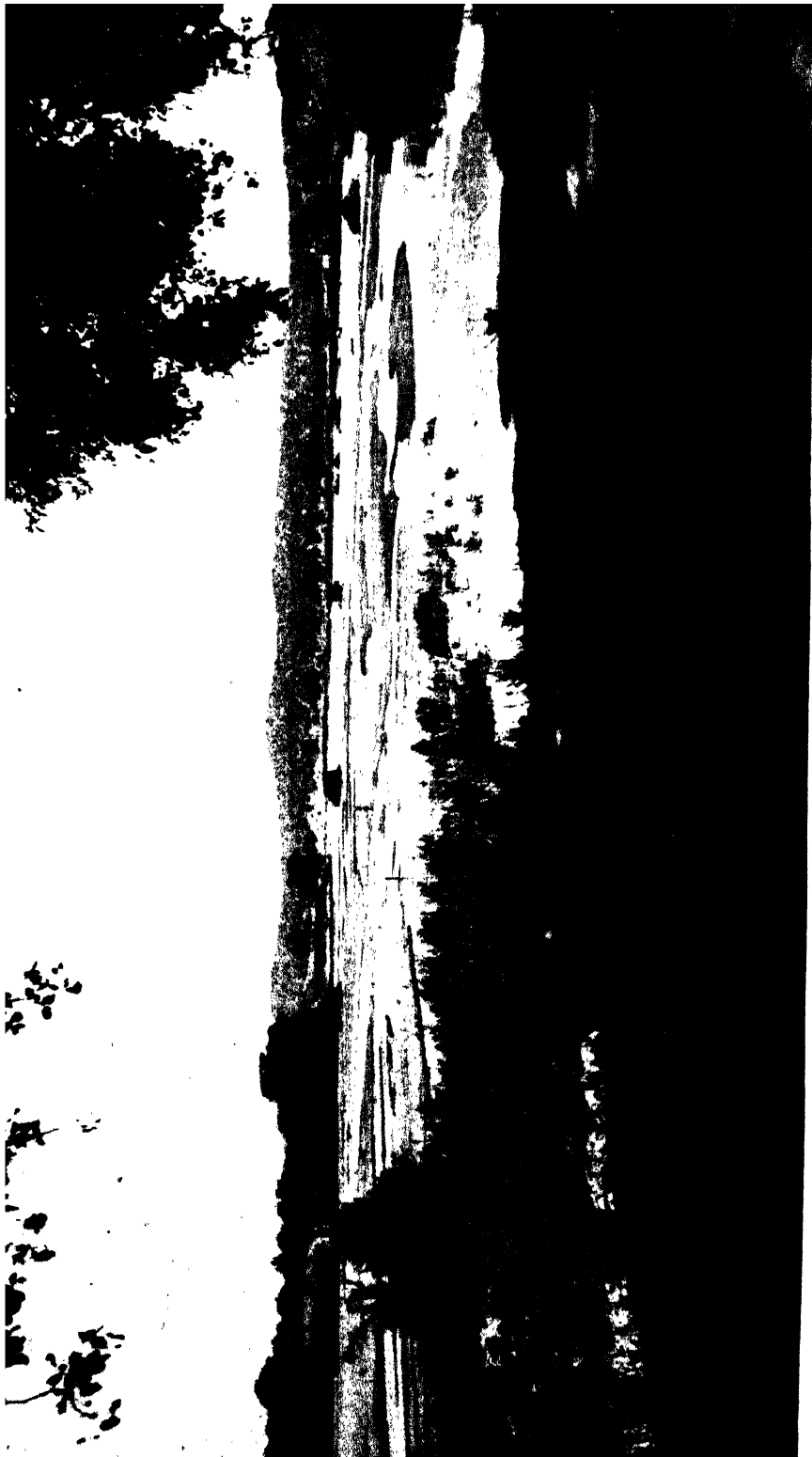
LIGNOSAE (WOODY DICOTYLEDONS)

- PASSIFLORACEAE—*Paropsia Brazzeana* Baill. (No. 3475a): shrub with elliptic serrulate pubescent leaves and globose crustaceous pubescent fruits with reticulate seeds.
- TILIACEAE—*Grewia cordata* N.E. Br. (No. 3475): small tree with obliquely ovate cordate leaves softly tomentellous below, and globose fruits the size of a small pea.
- EUPHORBACEAE—*Euphorbia matabelensis* Pax (No. 3488): leafless divaricately branched shrub with lateral clusters of softly pubescent flowers and fruits.
- CAESALPINIACEAE—*Isoberlinia globifera* (Benth.) Hutch. & B. Dary (No. 3476): resembles a *Brachystegia* but distinguished from most of them by the dense short fringe of hairs on the margins of the leaflets; fruits rusty tomentose.
- PAPILIONACEAE—*Bolusanthus speciosus* Harms (No. 3470): tree 20–40 ft. on river banks; leaves imparsipinnate; leaflets obliquely lanceolate, flowers violet-blue in racemes like *Wistaria*; fruits thin and flat, 3–4-seeded. *Baphia obovata* Schinz (No. 3477): shrub, with unifoliate elliptic leaves with strong lateral pubescent nerves and narrow pointed pods tapered to the base.
- CELASTRACEAE—*Gymnosporia senegalensis* Loes. (No. 3490): shrub, with short arrested lateral branchlets; spatulate leaves, and short cymes of pink fruits.
- ANACARDIACEAE—*Rhus lucens* Hutch. n. sp.¹ (No. 3473): a shrub or small tree up to 12 ft. with rounded-obovate glabrous leaflets and small panicles of flat shining fruits.
- RUBIACEAE—*Dirichletia Rogersii* Wernham (No. 3478): shrub 6 ft. high; leaves lanceolate, acute, pubescent on the ascending nerves. *Pavetta incana* Klotzsch (No. 3479): straggly bush 7 ft.; flowers in terminal clusters, in fruit, the latter black green, the size of a pea.

¹ *Rhus lucens* Hutch. sp. nov.

Frutex vel arbor parva usque ad 4 m. alta; ramuli annotini cinerei, lenticellis conspicuis. Folia trifoliolata; petioli 1.5–2 cm. longi, supra late sulcati, glabri; foliola late rotundato-obovata, apice rotundata et mucronulata, maxima usque ad 7 cm. longa et 4 cm. lata, margine undulata, utrinque nervosa et reticulata, nervis lateralibus utrinsecus usque ad 8. Paniculae axillares, foliis dimidio breviores; bracteae minutae, lanceolatae; pedicelli 1.5–2 mm. longi. Sepala oblonga, 1.25 mm. longa. Petala et stamina non visa. Fructus subcomplanatus, nitidus, glaber, late oblongus vel oblongo-rotundatus, 6–7 mm. diametro.

Rhodesia: In dry forest near the Victoria Falls, in open spots on sand, in fruit, 8th July, 1930, *Hutchinson & Gillett* 3473 (type in Kew Herbarium). Livingstone district, in young fruit, May, *Gairdner* 567.



[Photogr.: I. B. Poley Evans.]

The Limpopo River, near Messina, Northern Transvaal.



(Photogr. : I. B. Pole Evans.

Numerous "Baobabs", *Adansonia digitata* Linn. (BOMBACACEAE), in the Limpopo Valley, Northern Transvaal.



Sesamothamnus Lugardii N.E. Br. (PEDALIACEAE), near Messina, Northern Transvaal.

Photogr. : J. B. Pole Evans.



Photojr. : I. B. Pole Evans.

Thorn veld below the Lebombo Range near Komati Poort, Eastern Transvaal.



[Photogr. : I. B. Pole Evans.

The "Haak-en-steek", *Acacia spirocarpoides* Engl. (MIMOSACEAE), in the Springbok Flats, Northern Transvaal.



[Photogr. : J. B. Pole Evans.

Wild Olive trees, *Olea verrucosa* Link (OLEACEAE), on the Kaap Plateau, near Postmasburg.



bushes of *Acacia haematoxylon* Willd., *Turchonanthus camphoratus* Linn., and *Grevia cana* Sond., with *Aristida* grass, between Kuruman and Oliphants Hoek, in the
(Photogr. : I. B. Pale Evans,
South Eastern Kalahari.



The "Kameeldoorn", *Acacia Gouffiae* Burch. (MIMOSACEAE), in fruit near Kimberley.

Photogr. I. B. Poole Evans

HERBACEAE (HERBACEOUS DICOTYLEDONS)

- RANUNCULACEAE—*Ranunculus pubescens* Thunb. (No. 3485): slender herb near stream; leaves much divided, pubescent; flowers small, yellow.
- LYTHRACEAE—*Nesaea Schinzii* Koehne var. *Rehmannii* Koehne (No. 3484): small herb by stream; leaves opposite, lanceolate, auriculate at the base; flowers crimson.
- UMBELLIFERAE—*Steganotaenia araliacea* Hochst. (No. 3471): a leafless shrub up to 15 ft.; branches tipped by a cluster of bracts and a few compound dark red umbels of very small flowers; in Mopane-Combretum open wood.
- COMPOSITAE—*Denekia capensis* Thunb. (No. 3480): herb, by stream, with linear-lanceolate sessile auriculate dentate leaves woolly below; heads small, flowers bright blue. *Pegolettia senegalensis* DC. (No. 3472): weakly branched herb 1½–2 ft. in open stony places; leaves few, small and linear; heads discoid, yellow; pappus plumose. *Nidorella resedifolia* DC. (Nos. 3482, 3483): straggly herb with viscid pubescent narrow leaves, and small bright yellow flower-heads. *Nicolasia felicioides* (Hiern) S. Moore (No. 3486): small herb by stream; leaves linear, decurrent, denticulate; heads carmine, few. *Calostephane divaricata* Benth. (No. 3487).
- SCROPHULARIACEAE—*Sopubia simplex* Hochst. (No. 3481): erect herb 1½ ft. high; leaves linear-acicular; flowers in pairs on the racemes, crimson.
- LABIATAE—*Acrotoma inflata* Benth. (No. 3474): stems slender, with only one pair of leaves subtending the globose cluster of white flowers. *Tinnea zambesiaca* Welw. (No. 3489) (see p. 488).

An excursion in a different direction in the Combretum-Mopane forest, not far from the Falls, yielded only a few species: an *Aloe*, *A. zebrina* Bak. (No. 3491); 6 ft. high, branches of the inflorescence vertical, fls. rose; *Wedelia menotricha* Oliv. & Hiern (COMPOSITAE) (No. 3492); on rocks; leaves ovate, acuminate, serrulate, very scabrid; heads yellow; *Turraea zambesica* Sprague & Hutch. (*Meliaceae*) (No. 3493), tree 15 ft.; leaves simple, obovate, acute; flowers clustered, cream, with long-exserted style and capitate stigma, and *Stychnos dysophylla* Benth. (LOGANIACEAE) (No. 3494), a tree 20 ft., growing in damp places; leaves obovate-orbicular, softly pubescent below, 3-nerved from the base; fruits globose, 5 cm. diameter.

Before leaving the subject of the flora of Southern Rhodesia, about which very little has so far been published, the reader may be interested in a short *résumé* of a paper¹ on the types of vegetation, by Mr. J. S. Henkel, late Chief of the Division of Forests, which the present writer wrote for the *Kew Bulletin*.²

Although there are no really high mountains with subalpine vegetation, such as in East Africa, the distinct types of soil give rise to very marked vegetation formations.

The soils are grouped under four main heads, as follows: (1) the red clay soil, (2) granitic soil, (3) sandy soil, and (4) the black soil of the vleis and plateaux, the last so painfully familiar to the motorist there and in South Africa as "black turf". It is this soil which makes road travel in Rhodesia so difficult in the rainy season. On the red soil various species of *Acacia* are dominant; on the granite *Parinari*, *Protea* and *Faurea*, whilst a characteristic plant on the granite kopjes is the interesting resurrection plant *Myrothamnus flabellifolia* Welw. (see figure, p. 291); on the sandstone soils the beautiful *Terminalia sericea* Burch. (see p. 295), *Burkea africana*, and *Brachy-*

¹ By J. S. Henkel, Chief, Division of Forests, Southern Rhodesia, *Proc. Rhodesia Scientific Association*, vol. xxx, p. 22, with 5 maps (1931).

² *Kew Bulletin*, 1932: 158.

stegia spp. are the dominant trees. The black soil is characteristic of the "vleis" and is usually devoid of trees. It occurs mainly in those places where the subsurface drainage is poor, and becomes water-logged during the rains. This soil carries a heavy crop of coarse grass, sometimes as high as 15 ft. Alluvial soils are not extensive, owing to the steepness of the river grades, but "pockets" of alluvium are sometimes found in the middle veld at the entrance to river "poorts"; such place it is surprising to learn, are frost-hollows, and the occurrence of early or late spring frosts is actually the cause of the absence of many species of trees from these otherwise favourable localities. Frosts occur in the high and middle veld, and are often very severe. There is a frost line in both the Zambesi and Limpopo valleys, and is traceable by the boundary of the *Mopane* and *Hyphaene ventricosa*. In the low veld alluvial soils are more common and it is this deposit that carries the dominant *Mopane*, *Copaifera mopane* Oliv., which is so abundant from the foot of the Zoutpansberg in the Northern Transvaal to the Lundi River (see *Kew Bull.*, 1931 : 227).

One of the most interesting of Henkel's statements is the effect of the advent of Europeans, previous to which the country supported immense numbers of wild animals. Huge herds moving about caused tracks which prevented or limited the spread of fires during the dry season. Since the reduction in numbers of big game, annual fires have become a serious biotic factor, and they have destroyed vast tracts of valuable timber. There are now hundreds of square miles covered with short coppice growth which formerly carried a forest of large trees.

Motoring through Southern Rhodesia one finds parts of the roads "made up" with soil taken from neighbouring termite heaps. These vary in size according to situation from being small and inconspicuous to huge mounds in the forest having a diameter of 60 ft. and a height of 20 ft. They carry a very interesting flora, in fact a new flora as compared with that surrounding them, and sometimes very large trees which appear to be of considerable age.

Besides contour, temperature and rainfall maps, Henkel gives a well executed provisional map of the vegetation types of Southern Rhodesia, an enlarged edition of which is available. To those who, like the present writer, have visited Rhodesia for only a short time in the dry season and have found the vegetation of great interest, this paper is very valuable indeed, especially as it is characterised by an almost entire absence of the formidable phraseology and terms with which many ecologists find it necessary to arm themselves, but which often serve only to cloud and obscure the more interesting facts associated with the study of vegetation.

Chapter XXVIII

NORTHWARD FROM THE VICTORIA FALLS

ON Thursday, 10th July, we parted from a number of our companions who had come with us as far as the Falls, including Mrs. Smuts, who had looked after our personal comforts so well. They left to return to Pretoria, whilst we set out for the botanically little-known regions of North-eastern Rhodesia. For the next few days there were very few notes in my diary. My whole time was taken up with collecting whenever we came to a suitable locality, for much of this country in the dry season is pretty barren from a botanical collector's viewpoint. And the evenings were fully occupied with putting in the press plants gathered *en route*.

The country beyond Livingstone was open sand-veld covered with scattered *Brachystegia* and *Combretum*, grass, and *Copaifera Mopane*. About 45 miles on we met with a *Protea*, *P. chionantha* Engl. & Gilg (No. 3499), and at 64 miles I was delighted to encounter small groves of *Uapaca Kirkiana* Müll. Arg. (No. 3523), a small Euphorbiaceous tree 15 ft. high with the habit of, and bearing a striking resemblance in leaf to, *Rhododendron Falconeri* Hook. f. of the Himalayas. Conspicuous in burnt places by the roadside were a dwarf species of *Combretum*, *C. platypetalum* Welw. (No. 3524), with bright-scarlet flowers close to the ground, and a *Triumfetta*, *T. Mastersii* var. *heliocarpa* Sprague & Hutch. (No. 3525). A common Umbelliferous plant, something like the British *Anthriscus sylvestris*, was *Diplolophium zambesianum* Hiern (No. 3500), a herb 3-4 ft., with much-dissected leaves and white flowers. Between Livingstone and Choma, a distance of about 100 miles, we stopped to collect on this day at about ten different spots, and the species are enumerated in systematic order:—

Collected between Livingstone and Choma, Northern Rhodesia, 10th-11th July

LIGNOSAE (WOODY DICOTYLEDONS)

- PAPILIONACEAE—*Crotalaria cephalotes* Steud. (No. 3514): small annual with a crowd of narrow leaflets and yellow flowers; fruits small and broadly elliptic, pilose; seeds compressed, shining. *Dolichos densiflorus* Welw. (No. 3519): rambling herb; leaflets oblong-lanceolate, mucronate, pilose below; flowers axillary, 2-3 together, dull green yellow, purple marked in the middle of the standard. *Smithia strigosa* Benth. (No. 3520): shrub 3 ft.; flowers crowded in short lateral spikes with pilose pointed bracts.
- PROTEACEAE—*Protea chionantha* Engl. & Gilg (No. 3499): shrub; leaves oblong-oblancheolate, nervose; heads with silky bracts.
- POLYGALACEAE—*Polygala albida* Schinz (No. 3510): herb with linear leaves and dense oblong spike-like inflorescences of greenish-cream flowers.
- TILIACEAE—*Triumfetta Mastersii* var. *heliocarpa* Sprague & Hutch. (No. 3525): densely tomentose all over after fire; flowers yellow, often swarming with small black ants.
- MALVACEAE—*Hibiscus rhodanthus* Gürke (No. 3528): in open stony places; almost leafless, slender; flowers scarlet.

- EUPHORBIACEAE**—*Phyllanthus Welwitschianus* Müll. Arg. (No. 3505): stems several from a woody rootstock, simple; leaves broadly elliptic rounded or subcordate at the base, glaucous below; fruits depressed-globose. *P. glaucophyllus* var. *major* Müll. Arg. (No. 3515): stems simple, slender; leaves ovate, reddish. *Uapaca Kirkiana* Müll. Arg. (No. 3523) (see p. 483); fruits subglobose, the size of a crab-apple. *Euphorbia matabelensis* Pax (No. 3488).
- COMBRETACEAE**—*Terminalia silozensis* Gibbs (No. 3498): tree 15 ft.; leaves obovate-oblongeolate, reddish; fruits winged, elliptic, 3.5 cm. long, 2 cm. broad, glabrous. *Combretum platypetalum* Welw. (No. 3524) (see p. 483).
- LORANTHACEAE**—*Loranthus sansibarensis* Engl. (No. 3522): on *Parinari*; leaves elliptic, 5-nerved from the base; corolla-tube glabrous, slender, red, lower half of limb white, upper red.
- LOGANIACEAE**—*Strychnos dysophylla* Benth. (No. 3497): tree 15 ft., with rounded-obovate leaves and green globose fruits.
- RUBIACEAE**—*Oldenlandia lasiocarpa* Hiern (No. 3496): slender herb, with linear acute pubescent leaves and few-flowered cymes of scarlet flowers; pedicels slender, pubescent.

HERBACEAE (HERBACEOUS DICOTYLEDONS)

- RANUNCULACEAE**—*Clematis prostrata* Hutch. (No. 3504): prostrate in *Brachystegia* woods at 3700 ft. alt., common; leaf-segments very small.
- AMARANTACEAE**—*Pandlaka involuerata* Hook. f. (No. 3506): in fruit and almost leafless; bracts white, very acute.
- PLUMBAGINACEAE**—*Plumbago zeylanica* L. (No. 3513): straggling on cleared termite's nest in *Brachystegia-Uapaca* woods; calyx viscid; flowers white.
- COMPOSITAE**—*Vernonia Petersii* Oliv. & Hiern (No. 3511): a "shabby looking" herb with narrow pubescent leaves and subsessile heads of blue flowers. *V. superba* Oliv. & Hiern (No. 3521): herb with simple stem, several sub-radical broadly oblanceolate scabrid leaves; head solitary, 3.5 cm. diam. *Aster crenulatus* (Mett.) (No. 3509): slender erect annual with linear distantly serrate leaves and small yellow-orange flower-heads on slender peduncles. *Schistostephium dactyliferum* Hutch. (No. 3518): small slender shrub; leaves wedge-shaped, trilobed to the middle, pubescent and glandular; corymbs of small yellow heads pedunculate. *Helichrysum pachyrrhizum* Harr. (No. 3495): slender woolly herb with close set, woolly leaves; heads globose, with deep pink bracts. *Senecio discifolius* Oliv. (No. 3512): stems woolly; leaves narrowly obtriangular, coarsely dentate around the top; rays yellow.
- CRASSULACEAE**—*Kalanchoe lanceolata* Pers. (No. 3526) (see p. 465).
- UMBELLIFERAE**—*Diplolophium zambesianum* Hiern (No. 3500) (see p. 483).
- SCROPHULARIACEAE**—*Buchnera Henriquesii* Engl. (No. 3503) (see p. 465). *B. foliosa* Skan. (No. 3508): herb with narrow obtuse leaves and clusters of white flowers.
- ACANTHACEAE**—*Dyschoriste pillifera* Hutch. n. sp.¹ (No. 3501): a herb with stems clothed with long white hairs. *Hypoestes verticillaris* R. Br. (No. 3516):

¹ *Dyschoriste pillifera* Hutch. sp. nov. ramis pilis albidis mollibus longis distincta.

Herba laxa ramosa; rami ubique pilis albidis mollibus longis induti. Folia ovata vel ovato-elliptica, acute acuminata, basi breviter cuneata, 4–6 cm. longa, 2.5–3 cm. lata, tenuia, leviter pubescentia, nervi laterales utrinsecus 5–6; petioli 1 cm. longi, laxe pilosi. Flores axillares, fasciculati, subsessiles. Calycis tubus turbinatus, 6 mm. longus, breviter glanduloso-pubescent, lobis subulatis 3 mm. longis. Corolla calyce 1½ plo longior; tubus cylindricus, 1 cm. longus, lobis oblongis 7 mm. longis. Stamina 4; antherae 2-loculares, loculis basi breviter caudatis. Ovarium elongatum, glabrum; stylus 1.5 cm. longus, brevissime pubescens. Capsula clavata, 1.3 cm. longa, glabra, calyce persistente involucreta.

Northern Rhodesia: 49 miles north-east of Livingstone, 4000 ft., in dense scrub on kopje, 10th July, 1930, *Hutchinson & Gillett* 3501 (type in Kew Herbarium).

herb with white axillary flowers. **Crossandra spinescens** Dunkley (No. 3502): a straggling herb with petiolate, ovate-lanceolate leaves, and short spikes of red or yellow flowers subtended by prickly-lobed bracts.

LABIATAE—**Tinnea vestita** Baker (No. 3517): softly woody; leaves only sub-opposite, ovate-elliptic, softly pubescent and glandular; fruit bladdery; seeds fringed with plumose hairs. **Leucas nyassae** Gürke (No. 3527): prostrate herb with strongly nerved leaves and large heads of white flowers subtended by linear leaves.

At Choma the only species collected were *Uapaca nitida* Müll. Arg. (EUPHORBIACEAE) (No. 3529), a tree 20 ft. high, and an important constituent of upland *Brachystegia* forest, with rather small, oblong-elliptic, shining leaves and small fruits; and *Smithia strobilantha* Welw. (PAPILIONACEAE) (No. 3534), a small shrub with caterpillar-like inflorescences.

From Choma to the Kafue River, which we crossed by pontoon, was about another 100 miles on our journey, and it will be convenient to enumerate the plants collected on this stretch of country. Between these two points we camped near Monze (Friday, 11th July), and in the evening of the 12th (Saturday), our camp was beyond the Kafue.

Between Mazabuka and the Kafue, in the country known as the "Ridgeway", we observed numerous scattered examples of a remarkable *Phyllanthus*, *P. Engleri* Pax (No. 3564), a shrub 4–6 ft. high, with fascicles of annual branchlets borne on prickly, short, arrested branches, and hard, large, depressed-globose fruits about 3.5 cm. in diameter. There was also a great quantity of *Clematopsis Stanleyi* Hutch. in fruit, and this plant must provide a pretty sight when in flower. Approaching the Kafue were steep ridges covered with *Brachystegia*, etc., with beautiful autumnal colour-effects due to the red leaves of *Hymenocardia acida* Tul. (EUPHORBIACEAE) (No. 3556) (see figure, p. 487).

Collected between Choma and the Kafue River, Northern Rhodesia, 11th–12th July

LIGNOSAE (WOODY DICOTYLEDONS)

CAESALPINIACEAE—**Brachystegia mpalensis** De Wild. (No. 3555): a large tree; uppermost pair of leaflets about 6 cm. long; inflorescence unbranched, about 5 cm. long. **B. flagristipulata** Taub. (No. 3557): midrib of leaflets nearly central; leaflets about 3 cm. long; inflorescence with several spreading lateral branches. **Isoberrlinia globiflora** (Benth.) Hutch. & B. Dary (No. 3559): tree 30 ft.; leaflets shortly ciliate.

MIMOSACEAE—**Albizzia Antunesiana** Harms (No. 3558): leaflets few, rather large for the genus, 3–4 cm. long; flowers in heads, with white filaments and green anthers; fruits about 15 cm. long and 4 cm. broad.

PAPILIONACEAE—**Crotalaria natalitia** Meisn. (No. 3545): shrublet 3 ft. high; leaflets oblanceolate; standard petal brown, keel yellow; fruit narrowly oblong, glabrous. **Vigna nuda** N.E. Br. (No. 3536): very dwarf from a woody stock and leafless at flowering time; flowers dark pink.

FLACOURTIACEAE—**Flacourtia hirtiuscula** Oliv. (Nos. 3531, 3551): bush; leaves broadly obovate, widely crenate, hairy mainly on the nerves below; fruits drupaceous, 7–8 lobed.

TILIACEAE—**Triumfetta Dekindtiana** Engl. (No. 3525): herb 1–2 ft., stellate-tomentellous all over; leaves ovate-oblong, 3-nerved from the base; fruits covered with shortly pilose bristles. **Grewia Trothai** Burret (No. 3560): leaves elliptic, serrulate, 3-nerved from the base, thinly stellate-pubescent below; fruits verruculose.



[Photogr. by the Author.]

Euphorbia media N.E. Br. (EUPHORBIACEAE), between Choma and the Kafue River, Northern Rhodesia.

- MALVACEAE—*Hibiscus panduriformis* Hochst. (No. 3567): stems softly pubescent, the leaves ovate-rounded and cordate and tomentose, repand-dentate; flowers yellow with dull brick red centre.
- EUPHORBIACEAE—*Pseudolachnostylis Dekindtii* Par (Nos. 3530, 3543): shrub to 15 ft.; branchlets and elliptic leaves below softly pubescent; fruits globose, 2 cm. diam., glabrous. *Phyllanthus Engleri* Pax (No. 3564): shrub up to 10 ft.; annual leaf-bearing branches in fascicles from short arrested very prickly branchlets; fruits green, depressed globose, and very hard. *Hymenocardia acida* Tul. (No. 3556) (see note above). *Euphorbia media* N.E. Br. (No. 3565): a large bushy densely branched plant 20 ft. high and 30 ft. diameter, leafless, with cylindric fleshy branchlets.
- COMBRETACEAE—*Combretum Mechowlanum* O. Hoffm. (No. 3549): tree 20 ft.; leaves elliptic, rather densely lepidote below with whitish scales; fruits large, 3.5 cm. long, rusty-lepidote.
- LORANTHACEAE—*Loranthus guttatus* Sprague (No. 3533): on *Brachystegia*; leaves lanceolate; flowers sessile in clusters, corolla-tube pink, beautifully marbled with crimson; limb cream.
- RHAMNACEAE—*Helinus ovatus* E. Mey. (No. 3548): climber in scrub on termite heaps; leaves ovate, truncate at the base; fruits in 3's, obovoid-globose, 8 mm. long, with a broad circular scar at the top.
- ASCLEPIADACEAE—*Pachycarpus* sp. ? (No. 3562): stems erect, about 1½ ft.; fruits 6–7 cm. long; placentas membranous, transversely lined; seeds compressed, ovate, plumose.
- RUBIACEAE—*Gardenia Jovis-tonantis* Hiern (No. 3571): a small tree; leaves ternate, obovate, shining above; flowers yellow; fruit ellipsoid, about the size of a hen's egg. *Gardenia resiniflua* Hiern (No. 3573): a resinous bush; leaves obovate; fruit small, globose, about 1.5 cm. diam. *Leptactinia benguelensis* (Welw.) R. Good (No. 3553): prostrate shrublet in open woodland; leaves lanceolate, softly pubescent below; flowers solitary, cream,

the calyx nearly as long as the corolla. **Vangueriopsis lanciflora** (Hiern) Robyns (No. 3554): tree 15 ft., leaves obovate, shortly acuminate, softly tomentose below; clusters of flowers softly and densely tomentose; flower ends like beaks, greenish-cream. **Pavetta crassipes** K. Schum. (No. 3572): a shrub up to 9 ft.

VERBENACEAE—**Vitex Goetzei** Gürke (No. 3542): shrub; leaflets 5, sessile, obovate, softly tomentose below; fruits globose, shining, 2 cm. diam.

HERBACEAE (HERBACEOUS DICOTYLEDONS)

CARYOPHYLLACEAE—**Polycarpaea corymbosa** Lam. (No. 3538): 9 in. high, erect; stem pubescent; stipules scarious; cymes small, almost capitate, with warm-brown bracts.



Hymenocardia acida Tul. (EUPHORBACEAE), common and very widely spread in tropical Africa.

A, male branchlet; B, male bract; C, male flower bud; D, stamen; E, fruiting branchlet; F, leaf showing gland-dots.

AMARANTACEAE—**Psilotrichum gracilentum** C.B. Cl. (No. 3539): slender and graceful herb with opposite almost acicular leaves and slender spikes of reddish-brown flowers.

COMPOSITAE—**Vernonia vitellina** N.E. Br. (No. 3540): scrambler on termites' nest; leaves ovate, acute, entire, white-tomentellous below; flowers orange. **V. Perrottetii** Sch. Bip. (No. 3552): stems slender, about 1 ft. high; leaves almost acicular; heads few, widely campanulate, with numerous thinly woolly bracts. **V. leptolepis** Baker (No. 3561): coarse herb with narrowly obovate softly tomentose leaves and cream flowers surrounded by appendaged bracts. **V. glabra** Vatke (No. 3569) (see p. 465). **Laggera alata** Sch. Bip. (No. 3546): leaves oblong-lanceolate, decurrent, glandular below; heads viscid; flowers purplish. **Lactuca capensis** Thunb. (No. 3568): tall and slender; leaves linear, entire or coarsely toothed, acutely auriculate at the base; flower-heads pale blue.

- CONVOLVULACEAE—*Astrochlaena malvacea* Hall. f. (No. 3566): growing after fires; stems radiating from a woody rhizome; leaves ovate-elliptic, above thinly, below densely stellate-tomentellous; flowers solitary, mauve with purple centre.
- SCROPHULARIACEAE—*Striga euphrasioides* Benth. (No. 3537): erect, flowers scattered, cream; calyx closely nerved. *Buchnera trilobata* Skan (No. 3541): herb up to 2 ft. with few short linear leaves and short spikes of mauve flowers.
- ACANTHACEAE—*Lepidagathis sparsiceps* C.B. Cl. (No. 3532): herb with simple wiry stems, linear 3-nerved leaves and axillary globose clusters of white flowers surrounded by spinous acuminate ciliate bracts. *Blepharis caloneura* S. Moore (No. 3563): a scraggy plant with the leaves and flowers in clusters; leaves narrowly lanceolate, very acute, teeth spinous, softly pubescent on both surfaces. *Dicliptera nemorum* Milne-Redhead (No. 3544): straggly herb with small narrow leaves and small heads of pink flowers.
- LABIATAE—*Tinnea zambesiaca* Baker (No. 3547): shrublet 3 ft. with slender elongated branches; leaves ovate-lanceolate, glandular-punctate and slightly scabrid; fruits bladdery, 2 cm. long.

MONOCOTYLEDONS.

- LILIACEAE—*Aloe Christianii* Reynolds (No. 3550): on termite hills with patches of scrub; inflorescence unbranched, flowers rose. *Anthericum Buchanani* Baker (No. 3570): up to 6 ft. high; flowers white with yellowish-brown stripes.

On the north bank of the Kafue River ¹ we botanised among the thorny scrub composed of *Albizzia*, various CAPPARIDACEAE, and *Balanites*, a type of bush very difficult, and even dangerous to penetrate, for I was securely hooked several times, and it was easy to lose one's direction.

Between the Kafue River and Broken Hill was about another hundred miles on our route, and we made a good collection of about sixty species at various points on the way, and these are enumerated in systematic order on p. 493.

The most noteworthy were *Trichodesma physaloides* A.DC. (BORAGINACEAE) (No. 3590), with beautiful pale-blue flowers with a brown blotch in the sinus of the corolla-lobes, growing in grass-veld lately burnt about 18 miles north-east of the Kafue; *Tecomaria nyassae* Oliv. (BIGNONIACEAE) (No. 3598), a straggling shrub 10 miles north-east of Lusaka, with orange flowers, softly pubescent branchlets, about six pairs of rounded-ovate, serrate, softly pubescent leaflets; at the same place grew a straggling Acanthaceous plant with a densely viscid inflorescence and pale-mauve flowers—*Mellera nyassana* S. Moore (No. 3600).

Whilst still 28 miles to the south-west of Broken Hill we found many interesting plants, including *Helichrysum Kirkii* Oliv. & Hiern (COMPOSITAE) (No. 3603), with golden-yellow flower-heads and narrow, woolly leaves; and *Strobilanthes linifolia* (T. And. ex C.B.Cl.)

¹ Collected at the Kafue River: No. 3574, *Loranthus erianthus* Sprague (LORANTHACEAE); 3575, *Blepharis caloneura* S. Moore (ACANTHACEAE); 3576, *Loranthus rubroviridis* Oliv. (LORANTHACEAE); 3577, 3596, *Albizzia Harveyi* Fourr. (MIMOSACEAE); 3578, *Cadaba Kirkii* Oliv. (CAPPARIDACEAE); 3579, *Kalanchoe lanceolata* Pers. (CRASSULACEAE); 3580, *Balanites aegyptiaca* Del. (SIMARUBACEAE); 3581, *Trichilia emetica* Vahl (MELIACEAE); 3582, *Euclea divinorum* Hiern (EBENACEAE); 3583, *Euclea divinorum* Hiern; 3584, *Combretum elaeagnoides* Klotzsch (COMBRETACEAE); 3585, *Euphorbia angularis* Klotzsch (EUPHORBIACEAE); 3586, *Echinochloa pyramidalis* Hitchc. & Chase (GRAMINEAE).

Milne-Redhead, with almost as much authority behind it as name; a strong, rank-smelling plant with mauve flowers. Here I was also delighted to find a *Vernonia* which I thought in the field was *V. oocephala* S. Moore, but which proved to be slightly different, and named by De Wildeman *V. luteo-albida*; the flowers were white and visited by white butterflies, and it was fairly common in old cultivated land. The *V. oocephala* var. *angustifolia* S. Moore is a synonym. The greatest thrill for me personally was the discovery, among the grass of the *Brachystegia* wood, of a "child" of my own, and one which was the subject of my first published botanical plate. This was *Gardenia subacaulis* Stapf & Hutch., which was described in a joint paper

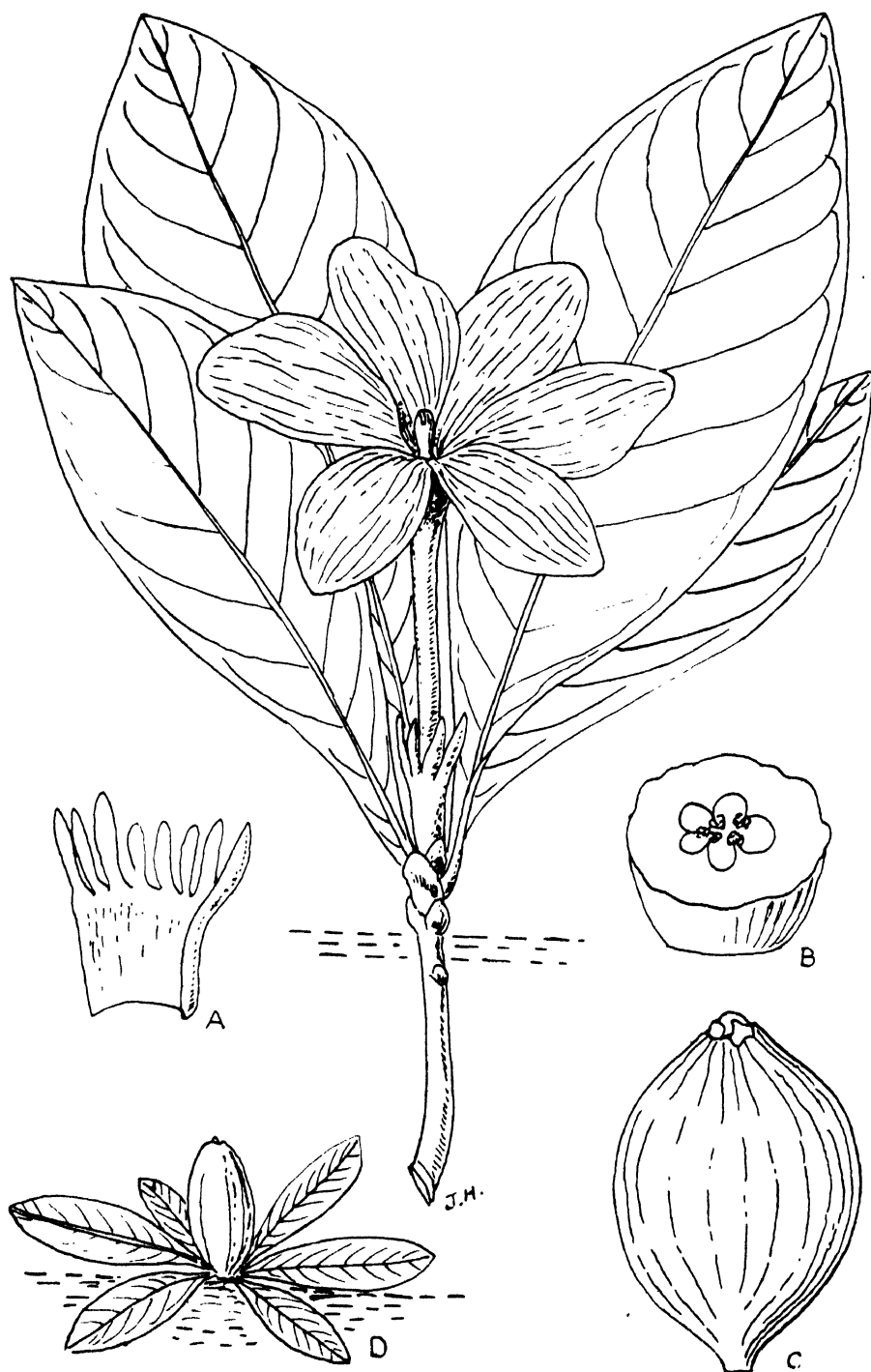


[Photogr. by the Author.]

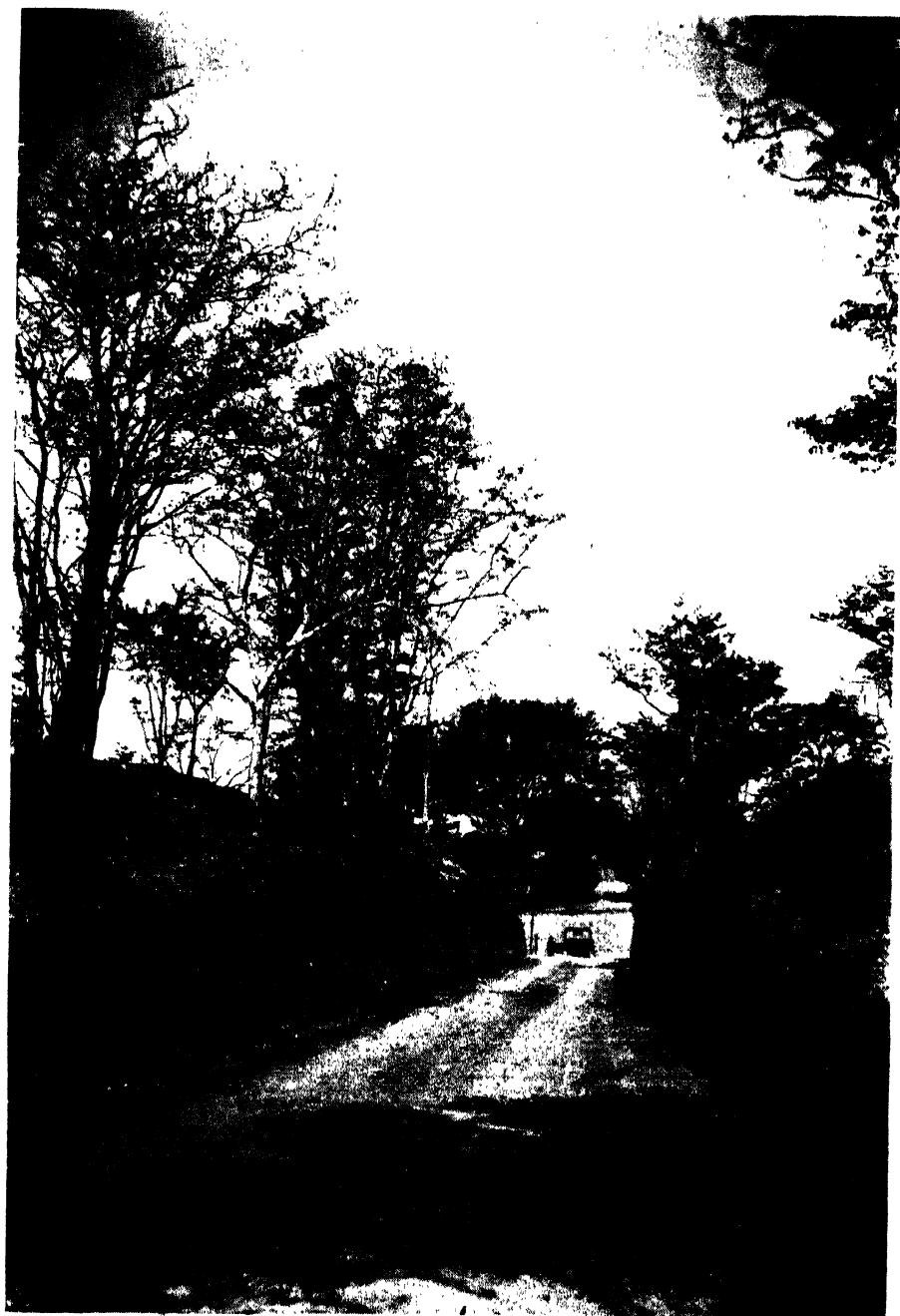
Crossing the Kafue River, Northern Rhodesia; General Smuts on the bank.

in the *Journal* of the Linnean Society when I was still a young botanist. I wish I could have had Dr. Stapf with me to see it. Its interest lies in its habit, a stemless shrub with a single flower, being an extreme reduction from the shrubs or trees which *Gardenias* usually are. I give a copy of the plate which I drew for the Linnean Society's *Journal*.

A handsome tree 20 ft. high was *Faurea speciosa* Welw. (PROTEACEAE) (No. 3625), with pubescent, strongly nerved leaves and fat, catkin-like inflorescences of silky flowers. Two pretty COMPOSITAE completed the more showy plants, *Pleiotaxis amoena* R. E. Fries (No. 3630), with bullate, obovate-elliptic, serrate, woolly leaves, and crimson flowers surrounded by silky tomentose bracts; and *Vernonia superba* O. Hoffm. (No. 3632,) with narrow, oblanceolate, serrate, scabrid leaves and large heads of mauve flowers.



Gardenia subacaulis Stapf & Hutch. (RUBIACEAE).
A, calyx; B, cross-section of ovary; C, fruit; D, plant in fruit.



[*Photogr. by the Author.*

At the Kafue River, Northern Rhodesia.



[Photogr. : Mrs. A. Gillett.]

General Smuts (right) and the Author at Kaloswe, Northern Rhodesia.

About 5 miles to the south-west of Broken Hill we found a very beautiful *Protea* (No. 3636), which we met with again on several occasions. It had lovely large heads of white flowers. This seems to be quite distinct from *P. chionantha* Engl. & Gilg, with which it was originally associated. *P. chionantha* is a low shrublet with short leafy stems terminated by a flower-head which is scarcely stipitate, and with relatively few series of bracts on the stipe; whereas *P. denudata*¹ is a

¹ *Protea denudata* Hutch. et E. A. Bruce sp. nov. a *P. chionanthae* Engl. et Gilg, ramulis floriferis efoliatis et crassioribus, capitulis longior stipitatis, stipite multibracteato differt. *Protea chionantha* Engl. & Gilg var. *divaricata* Engl. & Gilg in Warb. Kunene-Sambesi-Expedition 226 (1903); C. H. Wright in *Dyer Fl. Trop. Afr.* 6, 1 : 204 (1910).

Frutex ramosus usque ad 3 m. altus; ramuli floriferi efoliati, crassi, circiter 1 cm. diametro, cortice demum fisso et subdeciduo. Folia plerumque late obovata sed interdum anguste obovata, basi angustata, apice rotundata, usque ad 15 cm. longa et 9 cm. lata, glabra, nervis lateralibus numerosis a costa sub-angulo lato abeuntibus utrinque prominentibus paucis infra medium furcatis. Capitula magna, circiter 15 cm. expansa, stipite 2-3 cm. longo et multibracteato; bractee supra stipem circiter 6-seriatae, inferiores late ovatae, interiores oblongo-oblancoolatae et usque ad 7 cm. longae et 2.5 cm. latae, extra sericeo-tomentosae, intra basin versus breviter villosae. Flores plerumque albi, interdum rubescentes. Perianthium circiter 7 cm. longum; segmentum abaxiale vagina 1.5 cm. longa glabra, unque gracile 3.5 cm. longa, limbo 2.5 cm. longo villoso appendice 4 mm. longa; segmentum adaxiale subsimilis. Antherae 1.5 cm. longae. Ovarium villosum. Fructus 1.5 cm. longus, sicco longe brunneo-villosus.

Angola: Between the Kubango and Kassunga 1400 m., *Baum* 920 (type in Kew and Berlin Herbarium); near the Condo Waterfall, *Welwitsch* 1590b; open forest above Huilla, 1800 m., May, *Pearson* 2652. Northern Rhodesia: Mutanda Bridge, Solwezi district, 22nd June, *Milne-Redhead* 578. Broken Hill, May, *Rogers* 8031; 5 miles south-west of Broken Hill, 13th July, *Hutchinson & Gillett*

handsome much-branched shrub, the flowering branches leafless (except for lateral young shoots), and the head very stipitate, the stipe with several series of bracts.

**Collected between the Kafue River and Broken Hill,
13th July**

LIGNOSAE (WOODY DICOTYLEDONS)

- CAESALPINIACEAE—**Brachystegia reticulata** Hutch. & B. Dary (No. 3587): tree up to 35 ft., common and casting a light shade on stony kopjes and forming woods; leaflets small, decreasing upwards, reticulate; fruits about 9 cm., 4-seeded. **B. mimosifolia** Hutch. & B. Dary (No. 3614): a tree 30–40 ft., with flat crown; leaflets numerous, small, and crowded, the midrib to one side; stipules linear-filiform; branchlets hispid. **Isoberlinia paniculata** (Benth.) Hutch. & Greenway (No. 3624): tree 25 ft., in *Brachystegia* wood; leaflets 3 pairs, rather large, elliptic, fringed with short hairs; young fruits rusty-tomentose. **B. flagristipulata** Taub. (No. 3635): tree; leaflets about 15 pairs, medium sized, nearly contiguous, with a median pubescent midrib; fruits 15 cm. long, 4–5 cm. broad.
- PAPILIONACEAE—**Indigofera Rogersii** Fries (No. 3591): very small in burnt grass veld; leaflets 3–7, obovate-elliptic, thinly pubescent; flowers red in short racemes. **Aeschynomene glutinosa** Taub. (No. 3613): small shrub; leaflets about 6 pairs; fruits semilunar, warted. **Vigna esculenta** De Wild. (No. 3622): leafless, twiner on *Bauhinia Petersiana* Bolle. **Rhynchosia congensis** Baker (No. 3623): flowers green and cream; fruits 2-seeded, velvety; seeds glaucous, shining.
- PROTEACEAE—**Protea uhehensis** Engl. (No. 3608): a shrub 8 ft. in glades of *Brachystegia* woods; leaves sessile, oblong, pubescent; branchlets softly tomentose; heads small, lateral, subsessile; bracts silky; flowers brownish-white. **P. denudata** Hutch. & E.A. Bruce (No. 3636) (see p. 492). **Faurea speciosa** Welw. (No. 3625) (see p. 489). **F. intermedia** Engl. & Gilg (No. 3634): tree 15 ft.; leaves very narrowly lanceolate, acute, shortly silky below, with numerous delicate lateral nerves; flowers small, silky.
- POLYGALACEAE—**Polygala ukirensis** Gürke (No. 3605): stems very slender, about 2 ft. high, with very few narrowly linear leaves and lax racemes of smallish yellow flowers.
- EUPHORBIACEAE—**Uapaca nitida** Müll. Arg. (No. 3618): tree 20 ft.; leaves small, shining above, oblong-obovate, on slender petioles; fruits axillary, broadly ellipsoid, about 1 cm. long.
- DIPTEROCARPACEAE—**Monotes glandulosissimus** Hutch. (No. 3595): a new species at that time; a tree 20 ft., with elliptic leaves cordate at the base, and with a gland in the axils of several of the lower nerves. **M. angolensis** De Wild. ex Exell (No. 3615): leaves slightly narrowed and not cordate at the base, with only one gland at the base.
- OLACACEAE—**Olax obtusifolius** De Wild. (No. 3594): shrub up to 10 ft.; leaves ovate-lanceolate; flowers in short racemes, with slender persistent styles.

3636; between Mpika and Serenje, 14th July, *Pole Evans* 3056 (13); 5 miles north of Chiwele, 14th July, *Hutchinson & Gillett* 3654; on top of kopje near Abercorn Lake, 19th July, *Hutchinson & Gillett* 3903; 15 miles north-west of Abercorn, 19th July, *Hutchinson & Gillett* 3942; Kamboli, near Abercorn, 2nd July, *Michelmores* 460; between Lunzua River and Kambole Mission, common, *B.D. Burtt* 5980. Mufulira, May, *Eyles* 8240; Odzani River Valley, Umtali Div., *Teague* 93. Southern Rhodesia: Victoria Falls, March, *Rogers* 7482. Tanganyika Territory: Mpwapwa, Kibariani Mt., 1800 m., common, April, *B.D. Burtt* 3907; Mbulu district, 1800–1950 m., *B.D. Burtt* 630; Kimala River, East Mporotos, 1300 m., August, *Greenway* 3557. Nyasaland: Blantyre, September, *Buchanan* 15. Portuguese East Africa: Lichinga Plateau, March, *Gomes Sousa* 1361.



[Photogr. : Mrs. Gillett.

Looking down the Kafuo River, Northern Rhodesia.



[Photogr. : Mrs. Gillett.

Tackle for drawing across the pontoon at the Kafuo River; General Smuts in the foreground.

- LORANTHACEAE—**Loranthus Braunii** *Engl.* (No. 3602): flowers clustered on the older branchlets, crimson; corolla narrowly cylindric, with a head-like limb in bud.
- ANACARDIACEAE—**Rhus Eylesii** *Hutch.* n. sp.¹ (No. 3617): shrublet up to 1 ft. high, with trifoliolate softly pubescent leaves and shining fruits about the size of a pea.
- APOCYNACEAE—**Landolphia Kirkii** *Dyer* (No. 3601): scandent shrub, with branched tendrils; leaves variable, lanceolate to oblong, loosely pubescent on both sides; corymbs dense, flowers white.
- RUBIACEAE **Gardenia subacaulis** *Stapf & Hutch.* (No. 3621) (see p. 490). **Canthium venosum** (*Oliv.*) *Hiern* (No. 3610): straggling shrub; leaves ovate-elliptic, 5-nerved on each side, fruits simple or didymous, in short hairy cymes. **Temnocalyx fuchsoides** (*Welw.*) *Robyns* (No. 3633): shrub 3 ft., with purplish shoots; leaves whorled, obovate, cuneate at the base; peduncles axillary, mostly 2-flowered. **Oldenlandia Bojeri** *Hiern* (No. 3628): leaves clustered at the nodes, lanceolate, 5-nerved; flowers in a dense cluster at the ends of the stems; calyx-lobes as long as the fruit. **Borreria dibrachiata** (*Oliv.*) *K. Schum.* (No. 3627): hispid lanky herb with long internodes; leaves linear, glabrous; clusters of flowers at the nodes and tops of the shoots, scabrid-pilose outside.
- BIGNONIACEAE—**Tecomaria nyassae** *Oliv.* (No. 3598) (see p. 488).

HERBACEAE (HERBACEOUS DICOTYLEDONS)

- RANUNCULACEAE—**Clematis inciso-dentata** *A. Rich.* (No. 3597): in clumps of scrub on termite heaps; leaflets softly pubescent below, coarsely dentate; fruits with long plumose tails.
- COMPOSITAE—**Hypericophyllum compositarum** *Steetz* (No. 3593): leaves opposite, sessile, lanceolate, pellucid dotted; flower-heads orange, on slender peduncles. **Coreopsis Mattfeldii** *Sherff* (No. 3626): herb about 2 ft. with deeply pinnatifid leaves, and long-pedunculate heads with orange centre and yellow rays. **Schistostephium crataegifolium** *Fenzl* (No. 3619): stems lanky; leaves subsessile, much divided into narrow segments; heads few and laxly corymbose, yellow. **Aster crenulatus** (*Mattf.*) (No. 3604). **Lagera pterodonta** *Sch. Bip.* (No. 3620): stems with broad jagged wings; leaves coarsely toothed, scabrid glandular; heads purplish. **Helichrysum Kirkii** *Oliv. & Hiern* (No. 3603) (see p. 488). **Vernonia glabra** *Vatke* (No. 3588), here very dwarf owing to burning. **V. asterifolia** *Baker* (No. 3589): dwarf owing to burning; leaves short and linear, pubescent; heads corymbose, purplish blue. **V. luteo-albida** *De Wild.* (No. 3611): about 3 ft. high amongst grass; stems slender branched in the upper part; leaves linear; heads subcylindric, softly hairy. **V. Petersii** *Oliv. & Hiern* (No. 3629): herb about 1 ft.; leaves linear-lanceolate, serrulate, pubescent; heads few, with sharp pointed glandular and pilose

¹ **Rhus Eylesii** *Hutch.* sp. nov.

Fruticulus erectus 0·3-1·25 m. altus; caules simplices vel subsimplices, molliter tomentosi. Folia trifoliolata; petioli 1-2·5 cm. longi, dense tomentosi; foliola oblanceolata ad angustum oblongo-elliptica, terminale basi abrupte attenuata, lateralia basi angustata vel rotundata, usque ad 10 cm. longa et 4 cm. lata, supra primum arachnoideo-pubescentia, infra molliter et laxe tomentosa, crebre et prominenter nervosa, nervis patulis apicem versus furcatis. Inflorescentiae axillares, paniculato-spiceiformes, foliis breviores, ubique molliter tomentosae; flores parvi, glomerati, flavi; bractaeae lineari-subulatae, tomentosae, supra late sulcatae. Sepala ovato-triangularia, 1·3 mm. longa, extra pubescentia. Petala ovato-oblonga, glabra. Stamina petalis dimidio breviora. Discus patelliformis, undulatus, glaber. Ovarium glabrum; styli crassi. Fructus globoso-ellipsoideus, glaber, nitidus, fere 1 cm. diametro.

Southern Rhodesia: Salisbury District, January 1920, shrublet 2-4 ft., flowers dull yellow, *Eyles* 2042 (type in Kew Herbarium). Macheke, December 1919, *Eyles* 2010.

Northern Rhodesia: 28 miles south-west of Broken Hill, shrublet 1 ft. high, fruit 13th July, 1930, *Hutchinson & Gillett* 3617.

bracts. **V. lappoides** *O. Hoffm.* (No. 3631): herb 1 ft. high; leaves lanceolate, scabrid; heads solitary, very shortly pedunculate; bracts narrow, acute, thinly pubescent. **V. superba** *O. Hoffm.* (No. 3632): herb 2 ft., leaves oblanceolate, scabrid, dentate; heads 4–5 cm. diam. **Pleiotaxis amoena** *R.E. Fries* (No. 3630): leaves broadly lanceolate, denticulate-serrate, cobwebby below; heads crimson; involucre bracts about 7-seriate, softly tomentellous outside.

CONVOLVULACEAE—**Bonamia Hildebrandtii** *Hall. f.* (No. 3599): twiner; leaves lanceolate, markedly mucronate, appressed-pubescent below; corolla blue, densely pilose outside.

SCROPHULARIACEAE—**Buchnera Henriquesii** *Engl.* (No. 3601a) (see p. 465). **B. pulcherrima** *R.E. Fries* (No. 3606): herb 1 ft., with few narrow scabrid leaves and white flowers. **B. trilobata** *Skan* (No. 3607): similar to last but flowers mauve.

ACANTHACEAE—**Mellera nyassana** *S. Moore* (No. 3600) (see p. 488). **Strobilanthis linifolia** (*T. Ands.*) *Milne-Redhead* (No. 3609): 2–3 ft. shrublet, common; flowers pale mauve.

BORAGINACEAE—**Trichodesma physaloides** *A.DC.* (No. 3590) (see p. 488).

LABIATAE—**Leucas nyassae** *Gürke* (No. 3616): leaves few, broadly oblanceolate, serrate, thinly setulose; heads globose, long-pilose.

MONOCOTYLEDONS

LILIACEAE—**Aloe Chabaudii** *Schoenl.* (No. 3592) (see p. 456). **Albuca Wakefieldii** *Bak.* (No. 3612): leafless; raceme 1 ft. high, flowers yellow with green stripes.

From Broken Hill to ten miles beyond Chiwefwe, where we camped, was about another 100 miles. For the first ten miles there was much *Brachystegia* and *Uapaca*, and for quite ninety miles an endless forest of these two genera, with grass and a few other herbs. In a bog thirty-three miles from Broken Hill we collected a new species of *Genlisea*, *G. subviridis* *Hutch.* (LENTIBULARIACEAE) (No. 3644) with pale greenish-yellow flowers (described later on); *Utricularia firmula* *Welw. ex Oliv.* (LENTIBULARIACEAE) (No. 3645), with stems about 15 cm. long, and scattered sessile small lemon-yellow flowers with a slender spur; a pretty Labiate, *Aeolanthus conglomeratus* *Engl.* (No. 3643), with narrow oblanceolate glandular-punctate leaves, and short dense panicles of mauve flowers, the calyx circumscissile at the base and leaving a little stramineous cup; *Limnophila sessiliflora* *Blume* (SCROPHULARIACEAE) (No. 3639), with whorls of submerged multifid leaves, the exposed leaves less cut up and glandular-punctate, flowers pale cream with lower lip crimson; *Lobelia natalensis* *DC.* (LOBELIACEAE) (No. 3646), with much-reduced leaves and few blue flowers.

Collected between Broken Hill and 10 miles beyond Chiwefwe

LIGNOSAE (WOODY DICOTYLEDONS)

CAESALPINIACEAE—**Isoberlinia tomentosa** (*Harms*) *Craib & Stapf* (No. 3652): shrub 10 ft. by river; leaflets and fruit very large, the latter tomentellous.

PAPILIONACEAE—**Rhynchosyris Dekindtii** *Harms* (No. 3664): stems numerous from a woody branched rootstock, unbranched, with sharp angles; leaves simple, sessile, linear; flowers in panicles, mauve. **Crotalaria natalitia** *Meisn.* (No. 3670): small shrub; leaflets narrow, nearly glabrous; vexillum brown on the back, rest of flower yellow; fruits bladder-like, oblong, glabrous. **C. sparsifolia** *Baker* (No. 3681): shrublet with very slender branchlets and small narrow leaflets silky pubescent, small subsessile flowers,

and small subglobose fruits. **C. vasculosa** Wall. ex Benth. (No. 3684): leaflets narrowly obovate, pilose below; fruits ellipsoid-globose, small, densely pilose; seeds obliquely kidney-shaped. **Aeschynomene mimosifolia** Vatke (No. 3672): small viscid and delicately branched shrublet, with hispidulous shoots, small pinnate leaves, and small yellow flowers with orange vexillum. **Indigofera secundiflora** Poir. (No. 3679): small shrub, with hispid branches, obovate, mucronate leaflets, and numerous small cylindric fruits covered with rigid gland-tipped hairs. **Smithia strobilantha** Welw. (No. 3680): small shrub; branches covered with the persistent striate stipules; leaflets about 5 pairs, oblique; flowers yellow. **Smithia speciosa** Hutch. (No. 3695): shrub 3 ft., with small sessile clusters of blue flowers, on river banks.

SALICACEAE—**Salix subserrata** Willd. (No. 3653).

MORACEAE—**Ficus verruculosa** Warb. (No. 3649) (see p. 471).

PROTEACEAE—**Protea denudata** Hutch. & E.A. Bruce (No. 3654) (see p. 492): shrub up to 9 ft.; leaves broadly obovate-cuneate, glabrous; flowers rose, the head turbinate, with silky bracts. **P. trichophylla** Engl. (No. 3661): an undershrub about 1 ft. high, with broadly linear hairy leaves, and sessile turbinate heads of reddish flowers. **P. petiolaris** Welw. ex Engl. (No. 3662): a tree up to 20 ft. with petiolate curved narrowly lanceolate leaves and medium-sized sessile heads the outer bracts softly ciliate. **Faurea saligna** Harv. (No. 3692): tree 20 ft.; leaves oblanceolate, acute, glabrous, with numerous lateral nerves; flowers club-shaped in bud, silky.

MELASTOMACEAE—**Memecylon flavo-virens** Baker (No. 3688): shrub 6-10 ft. high; leaves opposite, narrowly obovate, blunt, yellowish green; fruits small, ellipsoid.

LORANTHACEAE—**Viscum shirensae** Sprague (No. 3687): on *Brachystegia*; leafless, flowers yellow.

ARALIACEAE—**Cussonia Kirkii** Seem. (No. 3655): tree 10 ft.; branches thick, with large horse-shoe shaped scars; leaves digitate; leaflets 7, narrowly obovate, acuminate, dentate, stalked.

RUBIACEAE—**Tricalysia nyassae** Hiern (No. 3690): shrub 10 ft., with leathery glabrous obovate leaves, and dense axillary clusters of brownish flowers with about 7 corolla-lobes. **Oxyanthus mollis** Hutch. n. sp.¹ (No. 3689): branchlets and lower surface of leaves hispid; leaves oblong, acuminate, about 15 cm. long; fruits ellipsoid, stipitate, 3 cm. long. **Canthium crassum** Schweinf. ex Hiern (No. 3691): shrub 15 ft.; leaves leathery, broadly elliptic, shortly pubescent below; fruits ellipsoid. **Borreria senensis** Hiern (K. Schum.) (No. 3678): stems hispid; leaves broadly lanceolate, scabrid above, pubescent below; flowers mauve, sessile.

VERBENACEAE—**Clerodendrum Buchneri** Gürke (No. 3685): dwarf about 1 ft. high; leaves long-petiolate, narrowly elliptic, slightly pubescent on the nerves below; inflorescence dark red, capitate; seeds with a red aril.

HERBACEAE (HERBACEOUS DICOTYLEDONS)

AMARANTACEAE—**Psilotrichum gracilentum** C.B. Cl. (No. 3673): very slender herb with opposite acicular leaves and long-pedunculate spikes of scarlet flowers.

¹ **Oxyanthus mollis** Hutch. sp. nov.

Arbor 7 m. alta; ramuli hispidi, internodiis 4-5 cm. longis. Folia oblonga, basi anguste rotundata, apice acuminata, 14-20 cm. longa, 4-5.5 cm. lata, supra glabra et subnitida, infra molliter hispida; nervi laterales utrinsecus circiter 12, supra prominuli, infra prominentes; petioli 1-1.5 cm. longi, supra canaliculati et carinati; stipulae ovato-cuspidatae, 1 cm. longae, extra hispidae. Flores non visi. Infructescentia axillaris, circiter 6 cm. longa; axis laxe pilosa; bracteae triangulari-acuminatae, acutae, 5 mm. longae, hispidae; pedicelli fructiferi 1-5 cm. longi, paucibracteolati. Fructus anguste ellipsoideus, utrinque contractus, 3 cm. longus, 1.5 cm. diametro, atro-viridis, parce setulosus, bilocularis.

Northern Rhodesia: 5 miles east of Chiwefwe, 4500 ft., in patch of forest by stream, tree 20 ft., fruits dark green, 15th July, 1930, *Hutchinson & Gillett* 3689 (type in Kew Herbarium).

- CAMPANULACEAE**—*Lightfootia glomerata* Engl. (Nos. 3668, 3682): slender herb; leaves sessile, linear-oblancoate, denticulate; flowers blue in axillary and terminal clusters.
- LOBELIACEAE**—*Lobelia nuda* Hemsl. (No. 3646): in a bog, stems 1–1½ ft. with few very small narrow leaves; flowers blue, few in a raceme on longish pedicels.
- COMPOSITAE**—*Vernonia Melleri* Oliv. & Hiern (Nos. 3651, 3657): leaves mostly radical, oblanceolate, and long-attenuated to the base, scabrid; flower-heads pale blue, with narrow, acute, scabrid-tipped bracts. *V. polysphaera* Baker (No. 3658): stems straight and simple, woolly at the base from a rhizome; leaves narrowly oblong-lanceolate, remotely dentate, very reticulate; heads clustered, axillary, sessile. *V. chloroppapa* Baker (No. 3666): on stony ridge in *Brachystegia* wood; slender herb and almost leafless, with white flowers and green pappus. *V. Nestor* S. Moore (No. 3677): stems pilose with jointed hairs; leaves oblong-lanceolate, acute, scabrid above, pubescent below; heads closely corymbose, with narrow silky acute bracts. *V. Bellinghamii* S. Moore (No. 3686): on rocky ridge in *Brachystegia* wood; shrub, with obovate leaves tomentose below, and small clusters of cylindric white flower-heads. *Aster crenulatus* (Maff.) (No. 3676): slender herb with linear leaves and yellow heads turning orange, on slender peduncles. *Anisopappus canescens* Hutch. n. sp.¹ (No. 3657). *Helichrysum angustifrondeum* S. Moore (No. 3667): on stony ridges in *Brachystegia* wood; herb with numerous linear softly woolly leaves, and close corymbs of small yellow flower-heads. *Gynura caerulea* O. Hoffm. (No. 3671): slender herb in moist dell; leaves coarsely toothed or lobed; flower-heads blue. *Dicoma sessiliflora* Harv. (No. 3656): stems simple, erect, leaves linear-lanceolate, glabrous and reticulate above, woolly below; heads yellow, axillary, sessile, with very sharp pointed bracts.
- SCROPHULARIACEAE**—*Buchnera* sp. (No. 3660): slender erect herb 1 ft. high, with deep mauve flowers arranged in four rows in a dense capitate spike elongated in fruit.
- LENTIBULARIACEAE**—*Genlisea subviridis* Hutch. n. sp. (No. 3644) (described later on). *Utricularia firmula* Welw. ex Oliv. (No. 3645): stems leafless, about 6 in. high; flowers lemon-yellow.
- ACANTHACEAE**—*Phayloopsis imbricata* (Forssk.) Sweet (No. 3669): a prostrate herb, with ovate petiolate leaves, and short spikes of white flowers subtended by rounded green bracts. *Hypoestes verticillaris* R. Br. (No. 3674): herb, with axillary clusters of white flowers; calyx lobes densely and softly villous.
- BALSAMINACEAE**—*Impatiens Irvingii* Hook. f. (No. 3693): on shaded river bank; leaves lanceolate-elliptic, closely toothed; flowers mauve, with a slender curved spur.
- LABIATAE**—*Coleus gracillimus* (Fries) Robyns & Lebrun (No. 3663): stems slender, leafless, unbranched; flowers sky blue, in panicles, with capillary

¹ *Anisopappus canescens* Hutch. sp. nov., affinis *A. Hoffmanniano* Hutch. nom. nov. (*Sphacophyllum candelabrum* O. Hoffm., non *Anisopappus candelabrum* Lev.), sed caulibus dense piloso-pubescentibus, involucri bracteae acutis difert.

Herba usque ad 0.75 m. alta; radices graciles, elongati; caulis parce ramosus, dense pilosus. Folia sparsa, oblongo-lanceolata ad ovato-lanceolata, basi cuneata vel rotundata, obtusissime dentata, 4–6 cm. longa, 1–3 cm. lata, utrinque strigilloso-pubescentia, nervis ascendentibus; petioli usque ad 3 cm. longi, pubescentes. Capitula solitaria, longe pedunculata, circiter 2.5 cm. diametro, flava; pedunculi superne ebracteati. Involucri bractee circiter 4-seriatae, oblongo-lanceolatae, acutae, 5–6 mm. longae, breviter pubescentes. Flores radii circiter 20; tubus gracilis, 2.5 mm. longus, glaber; lamina oblonga, apice tridentata, 6–7 mm. longa. Flores disci numerosi; corollae tubus 4 mm. longus. Achaenia fere glabra. Pappus cupularis, brevis, dentato-laceratus. Bractee receptaculi angustae, membranaceae, glabrae.

Northern Rhodesia: Chiwefwe, 4400 ft., herb with yellow flower-heads, 14th July, 1930, *Hutchinson & Gillett* 3659 (type in Kew Herbarium). Solwezi, in *Brachystegia* woodland, 11th June, 1930, *Milne-Redhead* 482. Mufulira, in open forest, 30th April, 1934, *Eyles* 8263. Belgian Congo: Mt. Senga, 15th May, 1908, *Kassner* 2975.

pedicels. **Acrocephalus rupestris** *R.E. Fries* (No. 3675): stems slender, softly puberulous; leaves linear-oblongate, gland-dotted, with very short leafy branchlets in their axils; heads few, corymbose, pale blue. **Aeolanthus conglomeratus** *Engl.* (No. 3643): small bush in bog; leaves narrowly oblanceolate, serrulate, deeply punctate; flowers mauve, densely paniculate.

ERIOCAULACEAE—**Eriocaulon Buchananii** *Ruhl* (No. 3647): at most 6 in. high, stems numerous from a rosette of short leaves; heads ovoid, nearly black, 4–5 mm. long. **E. zambesiense** *Ruhl* (No. 3648): about 9 in. high, stems solitary or few, from a rosette of broadly linear leaves; heads white, depressed, 7–8 mm. diam.

IRIDACEAE—**Gladiolus nyikensis** *Baker* (No. 3665): very slender, about 2 ft. high; leaves very narrow, exceeding the slender spike of pink flowers striate with red.

XYRIDACEAE—**Xyris batokana** *N.E. Br.* (No. 3640): in a bog; stems wiry, 2 ft. long; flowers bright yellow in cone-like head 1.5 cm. long, with stiff chaffy bracts. **X. Friesii** *Malme* (No. 3642): stems several and short, accompanied by a few linear leaves; flowers yellow in small heads with membranous bracts. **X. laciniata** *Hutch. n. sp.*¹ (No. 3641): tufted, in a bog, 3 ft. high; flowers yellow; bracts cuspidate-acuminate from a rounded very membranous lamina with lacerate margins.

We camped the first night after leaving Broken Hill about eight to ten miles beyond Chiwefwe, arriving in the semi-darkness. General Smuts had called at a farm, and brought into camp a large supply of luscious oranges, a present from the proprietor, Mr. Stephenson.

Long after the others had retired to rest, Jan Gillett and I were busy putting specimens into the presses, changing and drying papers, writing up notes over the camp-fire, and at other tasks which could be done only by the botanists.

At a river seventeen miles² north-east of Chiwefwe were collected *Gardenia imperialis* *K. Schum.* (RUBIACEAE) (No. 3698), a tree 20 ft. high, with very viscid leaf-buds, large obovate elliptic leaves, and ellipsoid fruits; *Aponogeton abyssinicus* *Hochst. ex A. Rich.* (APONOGETONACEAE) (No. 3699): leaves floating, oblong; inflorescences about 4 cm. long, at first enclosed in a long-beaked bract; and *Nymphaea capensis* *Thunb.* (NYMPHAEACEAE) (No. 3700), with blue flowers.

Our journey from Chiwefwe to Serenje Corner proved somewhat eventful to Jan Gillett and myself. After breakfast, a meal which experience taught us not to neglect in case we did not stop for lunch, we all botanised on the neighbouring hills, and returned to camp about 10.30. The remainder of our party left for our next camp, which was to

¹ **Xyris laciniata** *Hutch. sp. nov.* bracteis exterioribus suborbicularibus laciniatis distincta.

Caules caespitiosi, fere 1 m. alti, glabri. Folia linearia, usque ad 30 cm. longa et 3 mm. lata, 5–6-nervia, glabra. Capitula subglobosa, basi late cuneata, circiter 1 cm. longa. Bractee suborbiculares, cuspidato-acuminatae, membranaceae, superne laciniato-divisae. Flores flavi. Sepala 2 exteriora cymbiformia, carinata, 7 mm. longa, setoso-acuminata, carina minute pubescentia. Corollae tubus 4 mm. longus; lobi oblongi, 5 mm. longi. Antherae 3 mm. longae.

Northern Rhodesia: 33 miles north-east of Broken Hill, in acid swamp, flowers rich cream yellow, 13th July, 1930, *Hutchinson & Gillett* 3641 (type in Kew Herbarium); Mufulira, in open swamp, 8th June, 1934, *Eyles* 8349; 44 miles east of Abercorn, 31st March, 1932, *St. Clair-Thompson* 1247.

² Also collected: No. 3694, *Craterostigma Goetzei* *Engl.* (SCROPHULARIACEAE); 3695, *Smithia speciosa* *Hutch.* (PAPILIONACEAE); 3696, *Canthium malacocarpum* (*K. Schum. & Krause*) *Bullock* (RUBIACEAE); 3697, *Maesa lanceolata* *Forssk.* (MYRSINACEAE).

be about another 110 miles farther on, whilst we two remained behind to label and put in the press the numerous specimens we had just gathered. This was not finished until nearly midday, and the long journey had to be completed before nightfall.

We had proceeded only a few miles, however, when the back wheel of the car struck the stump of a *Brachystegia* in the road and became completely jammed. The car would go backwards, but not forwards, and to travel 100 miles or so in reserve gear was impossible on such a road. We tried our best to release the wheel, but found the tools provided too inadequate for the purpose. As it was late afternoon when we gave the thing up as a bad job, there seemed nothing to be



[Photogr. : Mrs. Gillett.]

Ox waggon on the Great North Road, near Chisambo, Northern Rhodesia.

done but make the best of it and prepare to spend the night where we were, though we had no doubt the General would return for us some time about midnight.

A rather shy native had watched us for a while, and when he realised that we could not proceed with the car, he set about making a place for us to stay the night. He dragged together out of the forest all the loose timber he could lay his hands on and lighted a fire. We had just settled down, however, when, to our great relief, we heard in the far distance, from the direction of Chiwefwe, the hum of an engine. It was a sweet, musical sound in the circumstances, and at length a Government Post lorry, with a crowd of native passengers on top and two of our countrymen on each side of the bonnet, drew up beside us. The driver had the necessary tools, and in a very short time the jammed rear-brake was removed and we were able to follow his trail northwards

in the darkness. We travelled thus for the remaining ninety or so miles to camp, which had been established near Serenje Corner. About 10 miles short of that spot we met the General on his way back to try to find us.

Next morning the District Commissioner arrived early in camp, and was very helpful with information as to our further journey. Whilst we had been delayed the previous day General Smuts and Mrs. Gillett had collected towards Serenje Corner a new species of *Monotes*, which I have named *Monotes cordatus* Hutch. (DIPTEROCARPACEAE) (No. 3703). Between Broken Hill and Lake Tanganyika our party collected several new species of this interesting genus, and there are no doubt still more to be found in these *Brachystegia* forests. In some places the bright-red, enlarged sepals subtending the fruits gave quite a gay colour to the landscape.

About 20 miles south-west of Serenje Corner a few plants had been added to our presses, including the new *Monotes* mentioned above, two species of *Polygala*, *P. Baumii* Gürke (POLYGALACEAE) (No. 3701), a shrublet with very narrow short leaves and green and mauve flowers in short racemes, and *P. myriantha* Chod., No. 3702, a small herb with spikes of very small mauve flowers; *Vitex milanjiensis* Britten (VERBENACEAE) (No. 3704), shrub with five obovate leaflets and nearly black olive fruits, and *Aster Eylesii* (S. Moore) Hutch. (COMPOSITAE) (No. 3705), a herb with the habit of *Erigeron canadensis* L., the small paniced heads being purple.

At Serenje Corner,¹ 5200 ft., 16th July, the most striking tree collected was a new species of *Faurea*, *F. argentea* Hutch.² (PROTEACEAE) (No. 3707), with silvery leaves (see figure, p. 502), and a shrub about 4 ft., *Temnocalyx Ancyланthus* (Schweinf.) Robyns, var. *puberula* Robyns (RUBIACEAE) (No. 3712), with opposite, sessile, obovate-orbicular, puberulous leaves and reddish, tubular, axillary flowers.

Here and there grew a beautiful species of *Leonotis*, *L. Pole Evansii* Hutch.³ (LABIATAE) (No. 3711), up to 10 ft. high, with brick-red flowers.

Between Serenje Corner and Mpika, yet another 100 miles on our

¹ Also collected at Serenje Corner: No. 3706, *Droogmansia Whytei* Schindl. (PAPILIONACEAE); 3708, *Crotalaria sphaerocarpa* Perrott. (PAPILIONACEAE); 3709, *Farao amara* Gilg (GENTIANACEAE); 3710, *Diospyros mespiliformis* Hochst. (EBENACEAE); 3713, *Paurolepis angustata* S. Moore (COMPOSITAE); 3714, *Combretum brachypetalum* R.E. Fries (COMBRETACEAE); 3715, *Viscum tenue* Engl. (LORANTHACEAE).

² *Kew Bulletin*, 1931: 232, 249.

³ *Leonotis Pole Evansii* Hutch. sp. nov. foliis parvis crassis spatulato-obovatis bullato-reticulatis valde distincta.

Herba usque ad 3 m. alta; caules subsimplices, quadilateraliter sulcati, molliter tomentosi. Folia spatulato-obovata, apice rotundata, basi breviter cuneata, 3-4 cm. longa, 1.5-2 cm. lata, utrinque bullato-nervosa et reticulata, nervis ascendentibus infra prominentibus. Verticillastri solitarii vel usque ad 3, 8-10 cm. diametro, multiflori. Flores rubri. Calyx turbinatus, 2 cm. longus, 10-nervus, extra villosus, lobis 5 triangularibus acutissimis 3-4 mm. longis. Corolla 4 cm. longa, dense villosa, labio superiore 2 cm. longo apice villosissimo, inferiore 1 cm. longo fere glabro et trilobato; filamenta leviter pubescentia; antherarum loculi divergentes 1.5 mm. longi. Stylus gracilis, glaber. Nuculae turbinatae, apice albido-incrustatae.

Northern Rhodesia: Serenje Corner, 5200 ft., herb up to 10 ft., flowers brick red, 15th July, 1930, *Pole Evans* 2884 (41) (type in Pretoria and Kew Herbarium); *Hutchinson & Gillett* 3711.



Faurea argentea Hutch. (PROTEACEAE).

A, lower surface of leaf; B, opening flower-bud; C, open flower; D, pistil and hypogynous scales.

journey, we botanised at five different points : (1) 22 miles north-east, (2) at the Lukulu River, (3) at 66 miles north-east, (4) at Kaloswe, and (5) between 6 and 10 miles short of Mpika. For some miles after leaving Serenje Corner there was a great quantity of the common bracken such as we see in Europe.

At our first stop we found a beautiful and very striking Labiate growing by the roadside among the bracken which formed a carpet below the *Brachystegia*; a very slender and intricately branched plant up to 4 ft. high, with scattered blue flowers. This proved to be an interesting species of *Coleus*, *C. elegantissimus* Taylor (*Plectranthus Baumii* Gürke, not *Coleus Baumii* Gürke) (No. 3716).

On the banks of the Lukulu River we found fairly large trees of *Myrica conifera* Burm. f. (MYRICACEAE) (No. 3726), a common Cape species, and beneath them fine examples of the Royal Fern, *Osmunda regalis* Linn. (No. 3727), a beautiful *Erythrina*, *E. tomentosa* R. Br. (PAPILIONACEAE) (No. 3731), another new species of *Monotes*, *M. lukuluensis* Hutch. (DIPTEROCARPACEAE) (No. 3741), and many other plants.

We were now not far away from Chitambo, some miles to the west, and the place where Livingstone died.

Collected between Serenje Corner and Mpika

FILICES—*Osmunda regalis* Linn. (No. 3727) (the well-known "Royal Fern").

LIGNOSAE (WOODY DICOTYLEDONS)

ANNONACEAE—*Artabotrys collinus* Hutch. (No. 3770): shrub 5 ft.; shoot tomentose; leaves elliptic to elliptic-lanceolate, the larger acuminate; fruits oblong, beaked, small, 2-seeded.

CAESALPINIACEAE—*Cassia Petersiana* C. Bolle (No. 3761): on rocks at Kaloswe; leafless; flowers yellow, in close cymes.

PAPILIONACEAE—*Crotalaria lanceolata* E. Mey. (No. 3728, 3733): herb 3–4 ft.; leaflets lanceolate, finely pubescent below; petals yellow and purple, striate; bracts reflexed; fruits covered with reflexed hairs. *C. amoena* Welw. ex Bak. (No. 3743): stems woody, to 3 fr., from a woody stock; leaves subsessile, silky below; flowers orange-yellow; keel purplish-brown. *Geisaspis apiculata* De Willd. (Nos. 3719, 3774): small shrub; leaflets about 4 pairs, oblong-elliptic, the midrib to one side; bracts bilobed. *Aeschynomene dissitiflora* Bak. (Nos. 3730, 3747): small shrub; leaflets oblong, 1 cm. long, sharply mucronate; flowers yellow. *Smithia strobilantha* Welw. (No. 3750): a shrub 3–4 ft.; branches hirsute; leaflets 3 pairs, 3–4-nerved; inflorescences like hairy caterpillars, about 2 cm. long. *Erythrina tomentosa* R. Br. (No. 3731): a tree about 20 ft., branches prickly; leaflets softly tomentose below; flowers scarlet; pod moniliform. *Mucuna coriacea* Baker (Nos. 3721, 3722): climber, leaflets softly tomentose below; flowers deep purple; pods covered with stinging hairs. *Vigna nuda* N.E. Br. (No. 3720): dwarf and leafless at flowering time, normally in burnt ground; flowers reddish-purple with patch of yellow at base of standard.

MYROTHAMNACEAE—*Myrothamnus flabellifolia* Welw. (No. 3763): on rocks at Kaloswe (see figure, p. 291).

MYRICACEAE—*Myrica conifera* Burm. f. (No. 3726): a small tree; leaves oblanceolate, entire or serrate in the upper part only, minutely glandular below; male spikes 2.5 cm. long.

PROTEACEAE—*Protea* (No. 3780). *Faurea speciosa* Welw. (No. 3724): small tree; leaves lanceolate-elliptic, with numerous forked lateral nerves, pubescent below; flowers cream, silky.

POLYGALACEAE—*Polygala Petitiana* A. Rich. (No. 3736): slender herb with linear leaves, and lax inflorescences of small yellow flowers marked with green. *P. usafuensis* Gürke (No. 3768): slender herb 4 ft., in swamp, with linear leaves and panicles of softly pubescent blue flowers.

- EUPHORBIACEAE**—*Uapaca zanzibarica* Pax (No. 3775): tree 25 ft. at foot of kopje at Kaloswe; leaves small, obtriangular, rounded or truncate at the top, thinly pubescent below; fruits shortly stalked, ellipsoid, 1.5 cm. long. *Euphorbia heterochroma* Pax (No. 3771): fleshy herb about 15 cm. high, on rocks at Kaloswe, very spiny, the spines in pairs, about 1 cm. long; flowers sessile, yellowish.
- DIPTEROCARPACEAE**—*Monotes lukuluensis* Hutch. (No. 3741): a tree about 20 ft., with broadly obovate-elliptic leaves rounded at the base and with a large gland; fruiting sepals 5.5 cm. long, puberulous. *M. oblongifolius* Hutch. (No. 3765): tree about 25 ft. high, with oblong leaves rounded at both ends, closely tomentellous below; fruiting sepals about 4 cm. long.
- HYPERICACEAE**—*Harungana madagascariensis* Lam. (No. 3769): shrub up to 8 ft., on rocks at Kaloswe; leaves opposite, lanceolate-elliptic, acuminate, shortly pubescent below; fruits small, green.
- MYRTACEAE**—*Syzygium cordatum* Hochst. ex Harv. & Sond. (No. 3729): tree 30 ft.; leaves sessile, oblong-elliptic, cordate; flowers in a short terminal cyme. *S. guineense* Guill. & Perr. (No. 3742): a tree 20-30 ft.; leaves shortly petiolate, elliptic, shortly acuminate; flowers white, in a broad terminal cyme.
- MELASTOMACEAE**—*Dissotis princeps* Triana (No. 3756): herb up to 3 ft. in swamp; leaves petiolate, ovate-elliptic, sharply and closely toothed, with 5 parallel nerves, closely bullate above; flowers maroon. *D. incana* Triana (No. 3772): in swamp at Kaloswe; leaves sessile, lanceolate, 5-nerved, stellate-tomentellous below; flowers pink, in oblong panicles.
- COMBRETACEAE**—*Combretum Guelnzii* Sond. (No. 3723): small tree; leaves elliptic, obtusely acuminate, closely and strongly reticulate below; fruits suborbicular, 2 cm. diam., finely lepidote towards the middle.
- ANACARDIACEAE**—*Heeria verticillata* Engl. (No. 3753): shrublet 1 ft. high; leaves opposite or whorled, oblong, long-mucronate, with very numerous strong parallel nerves spreading at a right angle.
- APOCYNACEAE**—*Landolphia Kirkii* Dyer (No. 3762): scandent shrub, with branched tendrils; leaves variable, mostly oblong, pubescent; corymbs subsessile, flowers white. *Strophanthus Welwitschii* (Baill.) K. Schum. (No. 3766): twiner on rocks at Kaloswe; leaves very small, linear-lanceolate; flowers greenish-yellow, corolla funnel-shaped.
- RUBIACEAE**—*Hymenodictyon floribundum* Robinson (No. 3764): shrub up to 15 ft., leafless and in fruit, the latter spicate, capsular, with numerous winged seeds. *Otomeria dilatata* Hiern (No. 3760): up to 6 ft. herb in swamp; leaves ovate-lanceolate, shortly pubescent below; flowers scarlet, with unequal calyx-lobes. *Borreria dibrachata* (Oliv.) K. Schum. (No. 3745) (see p. 495).

HERBACEAE (HERBACEOUS DICOTYLEDONS)

- GENTIANACEAE**—*Belmontia Teuszii* Schinz (No. 3757): herb up to 1 ft. in swamp; leaves few, narrowly ovate to lanceolate; flowers white.
- UMBELLIFERAE**—*Slum Thunbergii* DC. (No. 3759): fruits black.
- COMPOSITAE**—*Aspilia brachyphylla* S. Moore (No. 3717): straggler, hispid all over; leaves opposite, ovate to lanceolate, sparsely dentate; heads yellow, radiate. *Hypericophyllum compositarum* Steetz (No. 3777) (see p. 495). *Aster Eylesii* (S. Moore) (No. 3752): slender herb with very few narrow leaves; flowers pale blue or crimson, the rays very small. *Gynura crepidioides* Benth. (No. 3739): slender herb; leaves lanceolate, serrate; flowers crimson, bracts at length reflexed. *Emilia basifolia* Bak. (No. 3737): leaves obovate, crowded, undulate on the margin, woolly-tomentose; heads on long slender peduncles. *Anisopappus africanus* Oliv. & Hiern (No. 3738): herb about 2 ft.; leaves deeply sagittate-cordate at the base, triangular, crenate, glandular and shortly pubescent, rays yellow. *Sphaeranthus angustifolius* DC. (No. 3734): slender straggling herb; stems narrowly winged, purple; leaves linear, denticulate; heads crimson, ovoid, solitary. *Heliehrysum odoratissimum* Less. (No. 3725): herb, woolly all over; stems winged; leaves oblanceolate; heads very small, lemon-yellow, in dense flat-topped corymbs. *Vernonia Poskeana* Vatke (No. 3751): slender branched herb; leaves very narrow; heads blue; with softly tomentose

bracts. **Mikania scandens** Willd. (No. 3732): climber up to 15 ft.; leaves ovate, cordate, pubescent below; flowers white in close corymbs. **Erlangea eupatorioides** Hutch. & B.L. Burtt (No. 3776). **Dicoma anomala** Sond. (No. 3773): stems slender from a woody rhizome; leaves linear, with a close white felt below; flower heads grey.

SOLANACEAE—**Solanum nigrum** Linn. (No. 3767): straggly herb in shade of rocks; flowers greenish-cream.

LENTIBULARIACEAE—**Utricularia linarioides** Welw. (No. 3758): flowers 1-2 on a long stalk, purple.

ACANTHACEAE—**Lepidagathis dicomoides** Hutch. n. sp.¹ (No. 3779): a rigid stemmed herb 1-2 ft. high, with linear 3-nerved leaves and dense subsessile clusters of flowers subtended by narrow filiform-tipped bracts.

LABIATAE—**Geniosporum paludosum** Baker (No. 3746): 4 ft. high in a swamp; leaves ovate, closely serrate, scabrid; spikes subtended by ovate white bracts. **Becium odontopetalum** C. H. Wright (No. 3744): herb from a woody rootstock; leaves oblanceolate, denticulate, glandular-punctate and slightly pubescent; flowers pink. **Aeolanthus conglomeratus** Baker (No. 3748): leaves narrowly oblanceolate, obscurely serrulate, appressed-pubescent and black-dotted; bracts reddish; flowers pink in dense oblong paniculate clusters. **Acrocephalus sericeus** Briq. (No. 3749): herb 4 ft. high, with narrow pubescent leaves and corymbose heads of pale blue flowers. **Coleus shirensis** Gürke (No. 3778).

MONOCOTYLEDONS

XYRIDACEAE—**Xyris capensis** Thunb. (No. 3740): stems slender and wiry, with one small leaf towards the base; heads small with hard chaffy bracts; flowers yellow.

LILIACEAE—**Aloe zebrina** Baker (Nos. 3721a, 3781): almost stemless; leaves mottled; flowers red, with paler stripes.

CYPERACEAE—**Ascolepis anthemiflora** Welw. (No. 3735): stems about 1 ft. high; leaves linear-filiform; heads like those of a large orange Daisy, surrounded by 5-7 broad-based linear bracts.

At Mpika itself, now a well-known air station, there was little in flower, as much of the forest had been cleared. We were welcomed by the District Commissioner, who made every possible arrangement for our comfort. Huge fires were built by his "boys" around our camp, and for that night at any rate we had no fear of wild beasts.

Growing among the grass at Mpika² was a beautiful species of

¹ **Lepidagathis dicomoides** Hutch. sp. nov.

Caules 0.3-0.7 m. alti, stricti, lignosi, leviter quadrangulares, pubescentes. Folia sessilia, linearia, acuta, 4-6 cm. longa, 3-6 mm. lata, rigide chartacea, longitudinaliter 5-nervia, utrinque parce pubescentia, nervis infra prominentibus. Capitula axillaria, sessilia, subglobosa, 3-4 cm. diam., multiflora; bractae numerosae, anguste lanceolatae, longissime acuminatae, 1.5 cm. longae, pilosae et ciliatae. Calyx fere ad basin 5 partitus, 1.5 cm. longus, segmentis inaequilatis linearibus vel anguste lanceolatis, extra breviter pubescentibus marginibus plumoso-ciliatis. Corolla 1.5 cm. longa, extra pubescens; tubus inferne contractus, superne ampliatus, bilabiatus, labio adaxiale bidentato, abaxiale trilobato, lobis oblongis. Stamina 4; antherae leviter pubescentes. Ovarium glabrum; stylus 5 mm. longus, glaber. Capsula anguste ovoidea, glabra, 8 mm. longa.

Northern Rhodesia: 6 miles south-west of Mpika, in *Brachystegia* wood, 1-2 ft., 16th July, 1930, *Hutchinson & Gillett* 3779 (type in Kew Herbarium). Mukwela, June 1920, *Rogers* 26057. Southern Rhodesia: Lomagundi, 3800 ft., August 1923, *Dept. Agr. S. Rhod.* 3310.

² Also collected at Mpika: No. 3784, *Gynura caerulea* O. Hoffm. (COMPOSITAE); 3785, *Waltheria americana* L. (STERCULIACEAE).

Pleiotaxis, *P. sciaphila* S. Moore (COMPOSITAE) (No. 3783), with scarlet flower-heads. Seeds were collected, but failed to germinate at Kew.

Between Mpika and the Chambesi River, which flows into Lake Bangueolo, and yet a further 100 miles on this (to me) wonderful journey, our plant-presses were not unduly burthened with specimens, which are enumerated below,¹ none calling for any special mention.

And between the Chambesi and Kasama only three specimens were gathered,² but about 6 miles beyond the latter place, in swampy ground at the foot of granite, we drew up to collect a beautiful *Coleus*, the most handsome herbaceous plant observed on our whole journey. This was *Coleus mirabilis* Briq. (syn. *C. leucophyllus* Baker) (No. 3801), about 6 ft. high, with silvery-white foliage and multiflorous oblong panicles of sky-blue flowers, the panicles 1-1½ ft. long. In gathering specimens I sank nearly up to my knees in the mud, so that its cultivation in a greenhouse in this country might prove very difficult. There were no seeds. On our return journey we collected a host of interesting plants at this same spot, including two new species of *Nymphaea*, one *N. primulina* Hutch. (No. 4048), with beautiful primrose-yellow flowers, and a second with pale-blue flowers, but with all the leaves submerged and bilobed. In the *Kew Bulletin* (1931, p. 235) I published a description and figure (here reproduced), and called the new species *N. divaricata* Hutch., the bilobed leaves being recorded for only a few others, for *N. oxypetala* Planchon, from Ecuador, *N. amazonum* forma *submersa* Sagot, and occasionally for *N. alba* Presl. The plants were growing in deep and fairly slow-moving water, and the leaves formed a dense carpet about 2½ ft. below the surface of the water. To swim, dive and collect plants at the same time was delightful in such a warm climate. The full list of plants collected here on our return journey is given later on.

Our next stage took us from a few miles beyond Kasama due north to Abercorn, and we camped on the evening of 17th July some miles north of Kasama beneath a light mosaic-like blanket of *Brachystegia*, under which we lay, with the wonderful southern sky and its myraids of stars as a roof. We were now only about 100 miles from Abercorn, near the south end of Lake Tanganyika.

We started the next morning at eight o'clock along a good level road of brown sand, the light *Brachystegia* forest thereabouts much resembling a Devonshire wood in autumn, some of the young shoots giving the necessary colouring to the landscape.

¹ Collected between Mpika and the Chambesi River, N. Rhodesia : No. 3786, *Rhynchotropis Dekindtii* Harms (PAPILIONACEAE); 3787, *Polygala ukirensis* Gürke (POLYGALACEAE); 3788, *Cryptosepalum maraviense* Oliv. (CAESALPINIACEAE); 3789, *Tricalysia Nyasae* Hiern (RUBIACEAE); 3790, *Vincintella Stolzii* Mildbr. (SAPOTACEAE); 3791, *Cassia occidentalis* L. (CAESALPINIACEAE); 3792, *Gymnosporia buxifolia* Szysz. (CELASTRACEAE); 3793, *Garcinia polyantha* Oliv. (GUTTIFERAE); 3794, *Crotalaria nigricans* Baker (PAPILIONACEAE); 3795, *Smithia Carsonii* Baker (PAPILIONACEAE); 3796, *Geissaspis MacLouniei* De Wild. (PAPILIONACEAE); 3797, *Borreria dibrachiata* (Oliv.) K. Schum. (RUBIACEAE).

² Collected between the Chambesi and Kasama : No. 3798, *Senecio abyssinicus* Sch. Bip. (COMPOSITAE); 3799, *Tricalysia pachystigma* K. Schum. (RUBIACEAE); 3800, *Randia Kuhniana* F. Hoffm. & K. Schum. (RUBIACEAE); 3802, *Indigofera similis* N.E. Br. (PAPILIONACEAE); 3803, *Euphorbia dejecta* N.E. Br. (EUPHORBIACEAE).



Burmannia bicolor Mart. (BURMANNIACEAE).

A, upper part of perianth laid open; B, stamen; C, style; D, cross-section of ovary; E, fruit.

At 30 miles north¹ from Kasama we collected for the first time *Dodonaea viscosa* Jacq. (SAPINDACEAE) (No. 3807), in full fruit, and also a species of *Bridelia*, *B. ferruginea* Benth. (EUPHORBIACEAE) (No. 3810), and *Canthium*, *C. scabrosum* Bullock (RUBIACEAE) (No. 3808). The somewhat sombre green of much of this forest was brightened by an occasional tree of *Monotes*, with beautiful crimson enlarged sepals, which contrasted well with the bright yellow-winged fruits and foliage of the *Dodonaea*.

About 43 miles north² of Kasama it was particularly pleasing again to find specimens of *Gardenia subacaulis* Stapf & Hutch. (RUBIACEAE) (No. 3822) (see figure, p. 490).

Less than 50 miles south of Abercorn we stopped at another swampy area,³ which yielded a few interesting plants not seen elsewhere. These were *Burmannia bicolor* Mart. (BURMANNIACEAE) (No. 3827) stems 3–4 in. high; flowers solitary or paired, bluish-purple; a new species of a small genus of *Compositae* closely allied to *Erlangea*, *Volkensia ripensis* Hutch.⁴ (No. 3834). *Volkensia* differs from *Erlangea* in having alter-

¹ Also collected: No. 3805, *Vernonia sculptifolia* Hiern (COMPOSITAE); 3806, *Indigofera* sp. near *I. Garckeana* Vatke (PAPILIONACEAE); 3809, *Royena sericea* Bernh. (EBENACEAE); 3811, *Temnocalyx obovatus* (N.E. Br.) Robyns (RUBIACEAE); 3812, *Turraea robusta* Gürke (MELIACEAE); 3813, *Canthium crassum* Schweinf. ex Hiern (RUBIACEAE); 3814, 3815, *Securidaca longepedunculata* Pres. (POLYGALACEAE).

² Also collected: *Cremaspora africana* Benth. (RUBIACEAE); *Smithia Goetzei* Harms (PAPILIONACEAE); 3818, *Rhus* sp. (ANACARDIACEAE); 3819, *Psychotria* sp. (RUBIACEAE); 3820, *Isobertinia paniculata* Hutch. (CAESALPINIACEAE); 3821, *Randia Kuhniana* H. Hoffm. & K. Schum. (RUBIACEAE).

³ Also collected here: No. 3823, *Ipomoea tenuirostris* Choisy (CONVOLVULACEAE); 3826, *Guizotia Schultzii* Hochst. (COMPOSITAE); 3828, *Lobelia nuda* Hemsl. (LOBELIACEAE); 3829, *Utricularia Welwitschii* Oliv. (LENTIBULARIACEAE); 3830, *Drosera Burkeana* Planch. (DROSERACEAE); 3831, *Drosera madagascariensis* DC.; 3832, *Xyris capensis* Thunb. (XYRIDACEAE); 3833, *Justicia* sp. (ACANTHACEAE); 3835, *Otiophora pycnostachys* K. Schum. (RUBIACEAE); 3836, *Eriosema montanum* Bak. f. (PAPILIONACEAE); 3836, *Crotalaria cleomifolia* Welw. (PAPILIONACEAE); 3837, *Lightfootia tenuifolia* DC. (CAMPANULACEAE); 3838, *Borreria senensis* (Hiern) K. Schum. (RUBIACEAE); 3839, *Wahlenbergia virgata* Engl. (CAMPANULACEAE); 3840, *Oldenlandia effusa* Oliv. (RUBIACEAE); 3842, *Crotalaria senegalensis* Baill. (PAPILIONACEAE); 3843, *Polygala ruwenzoriensis* Chod. (POLYGALACEAE); 3845, *Senecio abyssinicus* Sch. Bip. (COMPOSITAE); 3846, *Gynura vitellina* Benth. (COMPOSITAE); 3847, *Pimpinella imbricata* (Schinz) Engl. (UMBELLIFERAE); 3848, *Coreopsis ochracea* O. Hoffm. (COMPOSITAE); 3850, *Indigofera laxeracemosa* Bak. f. (PAPILIONACEAE); 3851, *Ctenium concinnum* Nees (GRAMINEAE).

⁴ *Volkensia ripensis* Hutch. sp. nov.

Planta frutescens, circiter 1 m. alta; caules sicco crebre costati, leviter scabrido-pubescentes. Folia anguste elliptica vel lanceolata, sensim acute acuminata, basi subacuta, majora circiter 12 cm. longa et 4 cm. lata, repando-denticulata, supra leviter scabridula, infra brevissime pubescentia et glandulosa, sicco utrinque punctata; nervi laterales utrinsecus 9–12, infra prominentes; petioli 5–7 mm. longi, pubescentes. Corymbi multiflori, laxe ramosi, usque ad 10 cm. diametro; pedunculi ultimi breves, bracteati, bracteis subulato-lanceolatis leviter pubescentibus. Capitula purpurea, circiter 0.8 cm. diametro. Involucri bracteae 3–4-seriatae, late ovatae, cuspidato-acuminatae, breviter pubescentes, marginibus tenuioribus. Corollae tubus infra angusta et parce papillosus, superne sensim dilatatus, lobis acutis. Achaenia anguste turbinata, 4–5-costata, glabra, apice annulo cartilagineo integro et setis paucis (4–6) barbellatis caducis coronata.

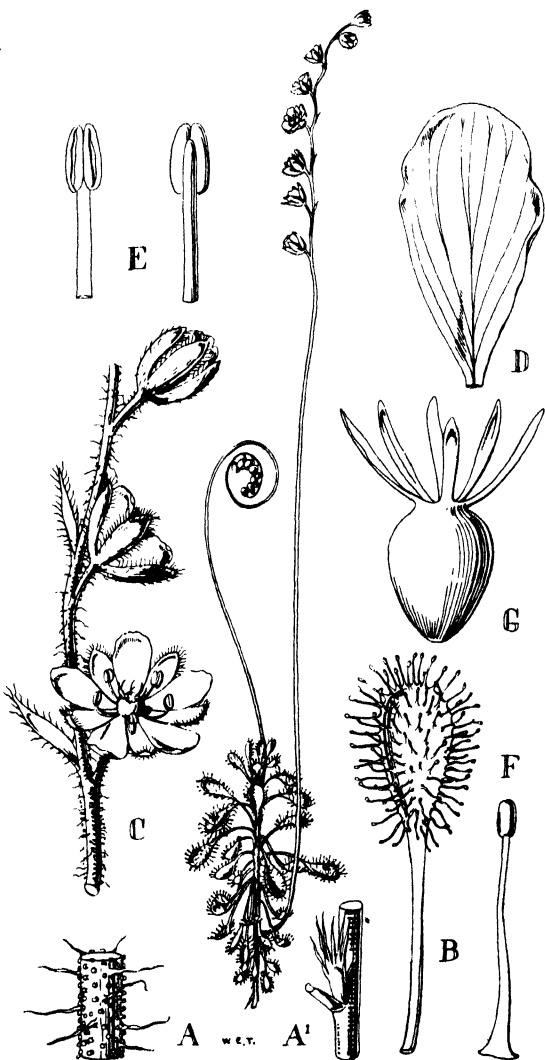
Northern Rhodesia: 44 miles south of Abercorn, 5000 ft., by stream, heads purplish, July, *Hutchinson & Gillett* 3834 (type in Kew Herbarium). Nyasaland: N'Cheere Mt., in rain forest, September, *Burt-Davy* 21229.

nate leaves and purplish corymbs, the achenes with a small well-marked cartilaginous rim from within which arise a few (4-6) short barbellate caducous pappus-bristles.

There was also growing here a liguliflorous Composite formerly included in *Hieracium*, but now referred to *Tolpis*, *T. capensis* (Linn.) Sch. Bip. (*Hieracium capense* Linn.) (No. 3841).

A striking plant was *Acrocephalus callianthus* Briq. (LABIATAE) (No. 3844), growing by the stream, with petiolate lanceolate leaves and a wide corymb of heads with the bracts and flowers pale blue. Another conspicuous and rather untidy Labiate was *Leucas villosa* Gürke (No. 3849), with pilose stems, lanceolate sessile leaves, and large clusters of white flowers.

Whilst still 30 miles ¹ from Abercorn we found the road carpeted with the small sky-blue-flowered *Pentanisia Schweinfurthii* Hiern (RUBIACEAE) (No. 3853a), some ACANTHACEAE, *Scutellaria paucifolia* Baker (SCROPHULARIACEAE) (No. 3852), on bare earth by the roadside, flowers crimson, and *Indigofera Hockii* De Wild. (No. 3855), a dwarf species with brick-red flowers, the short stems from a woody rootstock, and 3 miles farther on ² the most strik-



Drosera madagascariensis DC. (DROSERACEAE).

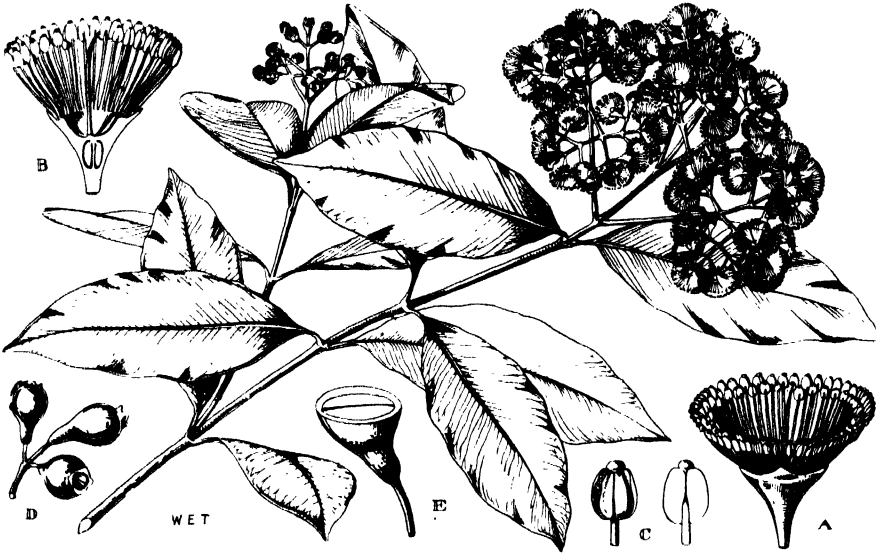
A, portion of stem; A1, stipule; B, leaf; C, portion of raceme enlarged; D, petal; E, stamen, front and back; F, gland-tipped hair of leaf; G, fruit.—From Hutch. & Dalz. Fl. West. Afr.

¹ Also collected: No. 3853, *Oldenlandia setifera* (DC.) K. Schum. (RUBIACEAE); 3854, *Peristrophe pumila* (Lindau) Lindau (ACANTHACEAE).

² Also collected: No. 3858, *Aeschynomene mimosifolia* Vatke (PAPILIONACEAE); 3859, *Crotalaria sphaerocarpa* Perrott. (PAPILIONACEAE); 3863, *Vernonia lampropappa* O. Hoffm. (COMPOSITAE); 3864, *Dicoma sessiliflora* Harv. (COMPOSITAE); 3866, *Buchnera Nuttii* Skan (SCROPHULARIACEAE); 3867, *Lightfootia glomerata* Engl. (CAMPANULACEAE); 3868, *Sphenostylis erecta* Hutch. (PAPILIONACEAE).

ing species collected were *Vernonia luteo-albida* De Wild. (COMPOSITAE) (No. 3857) (see p. 489), and a weird, leafless LABIATAE, *Plectranthus primulinus* Baker (No. 3860), with a bunch of pale-yellow flowers at the end of the shoots. A *Vernonia*, which may always be spotted because of its green pappus, *V. chloropappa* Baker (No. 3861), the flowers purple, grew here and there.

In bare places in *Brachystegia* forest was a prostrate Acanthaceous plant, with elongated branches, small lanceolate 3-nerved leaves and sessile clusters of white flowers, *Lepidagathis lanato-glabra* C.B. Cl., var. *latifolia* C.B. Cl. (No. 3865).



Syzygium guineense DC. (MYRTACEAE), near the Victoria Falls.

A, flower with corolla removed; B, the same in vertical section; C, anthers front and back, showing gland at tip of connective; D, fruits; E, cross section of fruit.—From Hutch. & Dalz. Fl. West Trop. Afr.

About 5 miles south of Abercorn a familiar-looking small tree proved to be *Syzygium guineense* Guill. & Perr. (MYRTACEAE) (No. 3869), a very common species in West Africa, and widely spread.

From the way in which Abercorn is recorded on the maps one imagined it to be something of a town, and we were much surprised, therefore, to find it consisted of only a few houses, with about a dozen Europeans. In these days of air travel no doubt it has expanded.

The District Commissioner had kindly selected a site for our camp near a small lake about a mile from Abercorn, and we collected a number of specimens near by.¹ These included a fine new species of

¹ Also collected: No. 3870, *Lopholaena petrophila* Phill. & C.A. Smith (COMPOSITAE); 3871, *Tricalysia pachystigma* K. Schum. (RUBIACEAE); 3872, *Rotala Gossweileri* Koehne (LYTHRACEAE); 3873, *Uapaca nitida* Müll. Arg. (EUPHORBIACEAE); 3875, *Ascolepis capensis* Benth. (CYPERACEAE); 3877, *Erythrina tomentosa* R. Br. (FAPILIONACEAE); 3879, *Ocimum trichodon* Baker (LABIATAE); 3880, *Tinnea ericalyx* Welw. (LABIATAE).

Acrocephalus, *A. speciosus* E. A. Bruce (LABIATAE) (No. 3881), which was subsequently collected by the late Mr. B. D. Burt; a herb 2½ ft. high, with sessile lanceolate bullate leaves and dense spikes 3 cm. long of blue flowers; *Dissotis Trothae* Gilg (MELASTOMACEAE) (No. 3874); shrub; leaves elliptic, closely pectinate-serrate, densely scabrid-pilose; flowers mauve in short terminal cymules; *Hymenocardia acida* Tul. (EUPHORBIACEAE) (No. 3876) (see figure, p. 487); *Triumfetta palmatiloba* Dunkley (TILIACEAE) (No. 3878), woody up to 8ft. high; leaves palmately lobed, stellately tomentellous below; flowers yellow; fruits with pubescent bristles ending in a slender setose tip.



By the wayside near Abercorn.

[Photogr. by the Author.]

A small kopje ¹ near the same lake yielded several interesting species, which filled our presses, including *Clerodendrum spinescens* Gürke (VERBENACEAE) (No. 3882) (see p. 476), *Pleiotaxis sciaphila* S. Moore (COMPOSITAE) (No. 3885) (see p. 506); *Tecomaria capensis* Spach (BIGNONIACEAE) (No. 3886), trailing on low bushes, leaves pinnate,

¹ Also collected: No. 3883, *Polygala ukirensis* Gürke (POLYGALACEAE); 3884, *Aneilema aequinoctiale* Kunth (COMMELINACEAE); 3889, *Vernonia sculptifolia* Hiern (COMPOSITAE); 3890, *Smithia Carsonii* Baker (PAPILIONACEAE); 3891, *Smilax Kraussiana* Meisn. (SMILACACEAE); 3892, *Tinnea ericalyx* Welw. (LABIATAE); 3894, *Punica granatum* Linn. (PUNICACEAE); 3895, *Canthium crassum* Schweinf. ex Hiern (RUBIACEAE); 3896, *Psychotria* sp. (RUBIACEAE); 3897, *Pavetta* sp. (in fruit) (RUBIACEAE); 3898, *Microglossa volubilis* DC. (COMPOSITAE); 3899, *Anisophyllea pomifera* Engl. & von Brehm. (RHIZOPHORACEAE); 3900, *Faurea speciosa* Welw. (PROTEACEAE); 3904, *Pavetta canescens* DC. (RUBIACEAE); 3905, *Flacourtia Ramontchi* L'Herit. (FLACOURTIACEAE).

flowers red; a new species of *Dissotis*, *D. venulosa* Hutch.,¹ a shrub 7 ft., with a white stem 3 in. in diameter, and terminal cymes of purple flowers; in dissecting flowers of this I have observed a very neat arrangement of the stamens in the bud stage; as in the family generally, the anthers are inflexed, and in this particular species of *Dissotis*, at any rate, the five anthers with the connective long-produced at the base extend far down into the cavities between the calyx-tube (hypanthium) and the ovary, which are united by ribs, leaving cavities between each rib; whether this is general in the genus I cannot say, but it seems a very interesting feature; *Lasiosiphon lampranthus* Engl. & Gilg (THYMELAEACEAE) (No. 3888), a shrub about 10 ft. high, with oblong acute silky leaves and globose balls of orange flowers; *Loranthus Dregei* Eckl. & Zeyh. var. *taborensis* (LORANTHACEAE) (No. 3893), leaves elliptic, stellate-tomentellous below, flowers axillary, sessile, villous; two species of *Brachystegia*, *B. taxifolia* Hutch. & B. Davy (CAESALPINIACEAE) (No. 3901), with numerous very closely arranged small leaflets and short dense inflorescences, and *B. Bragei* Harms (No. 3902), with about five pairs of widely separated leaflets and hard elastic fruits and a *Protea*, *P. denudata* Hutch. & E. A. Bruce (PROTEACEAE) (No. 3903) (see p. 492).

Though the country we had traversed from Broken Hill to Abercorn was very little known botanically, the part we were now to explore was even less so, and almost untouched at the time of our visit. This was the region between Abercorn and the south end of Lake Tanganyika, and we made a very interesting collection, including not only a few new species, but a genus not so far recorded from Tropical Africa, the genus *Pteronia*.

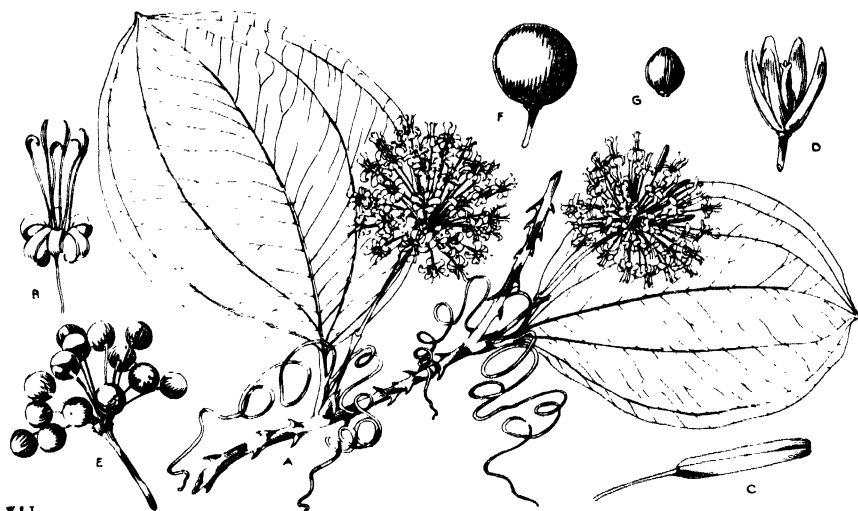
From Abercorn we proceeded on 19th July towards Lake Tanganyika, an inland sea I was eager to behold, for never in my wildest imagination had I ever expected to visit it. By a small stream 7 miles² north-west of Abercorn was a beautiful tree of *Occhthocosmus* (No. 3910), which proved to be new, and which I have named after Mrs.

¹ *Dissotis venulosa* Hutch. sp. nov. affinis *D. Johnstonianae* Bak. f., sed pedicellis brevissimis differt.

Frutex 3.5 m. altus, caule albo 8 cm. diametro; ramuli circiter 1 cm. crassi, parce setulosi. Folia opposita, ovato-elliptica, basi rotundato-cordata, apice sensim acuminata, 8-10 cm. longa, 5-6 cm. lata, rigide chartacea, utrinque bullato-venulosa et parce setulosa; nervi primarii 5, infra prominentes, secundarii numerosi, patuli; petioli 1.5-2.5 cm. longi, setulosi. Cymae terminales, breviter pedunculatae, 6-10 cm. longae; bractae mox deciduae. Receptaculum campanulatum, 1 cm. longum, glabrum. Calycis tubus 2 mm. longus; lobi 5 rotundati, 4.5 mm. longi, ciliati. Petala 5, purpurea, late obovata, fere 2 cm. longa, intra basin versus parce pubescentia. Antherae 1 cm. longae, longe exsertae; filamenta longiora 1.5 cm. longa, supra medium geniculata. Ovarium apice hirsutum; stylus glaber.

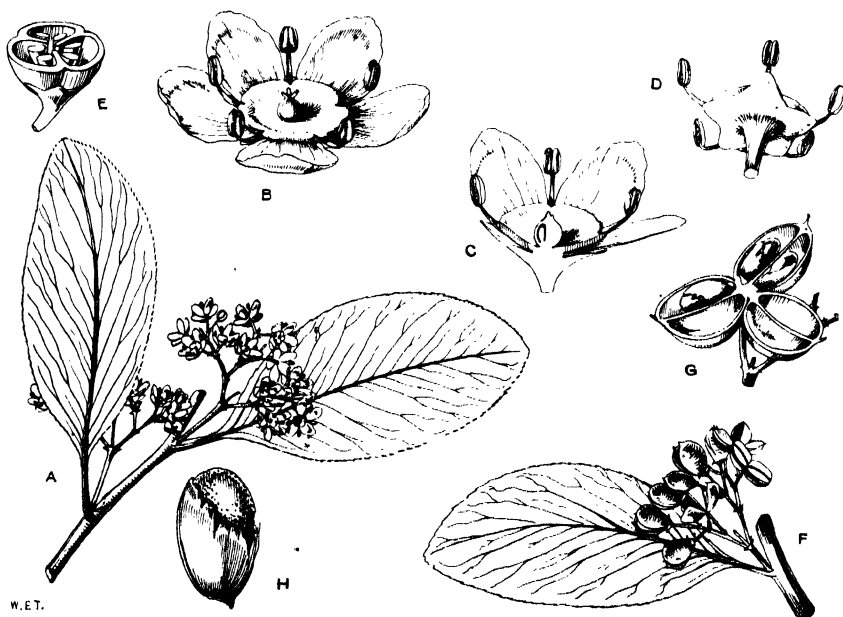
Northern Rhodesia: Among *Protea*, etc., on kopje by small lake near Abercorn, 5300 ft., shrub 7 ft., with white stems 3 in. in diam., 19th July, 1930, *Hutchinson & Gillett* 3887 (type in Kew Herbarium).

² Also collected: No. 3908, *Hibiscus rhodanthus* Gürke (MALVACEAE); 3909, *Crotalaria lachnocarpa* Engl. (PAPILIONACEAE); 3911, *Gymnosporia senegalensis* Lam. (CELASTRACEAE); 3912, *Allophylus africanus* P. Beauv. (SAPINDACEAE); 3914, *Merremia pterygocaulis* Hall f. (CONVOLVULACEAE); 3916, *Mussaenda arcuata* Poir. (RUBIACEAE); 3917, *Harungana madagascariensis* Lam. (HYPERICACEAE); 3918, *Acacia karroo* Heyne (MIMOSACEAE); 3919, *Tricalysia mucronulata* K. Schum. (RUBIACEAE).



Smilax Kraussiana Meisn. (SMILACACEAE), widely spread in Tropical Africa south to Pondoland.

A, flowering shoot; B, male flower; C, stamen; D, female flower; E, fruits; F, fruit; G, seed.



Gymnosporia senegalensis Loes. (CELASTRACEAE), from near Abercorn.

A, flowering shoot; B, open flower; C, vertical section of same; D, flower from below; E, cross-section of fruit; F, fruits; G, same, open; H, seed, with aril.—After Hutch. & Dalz. Fl. West Trop. Africa.

Arthur Gillett, *O. Gillettiae*.¹ It was 20 ft. high, and covered all over with white flowers like a hawthorn. *Ochthocosmus* belongs to ERYTHROXYLACEAE.

A peculiar Papilionaceous plant was *Droogmansia Whytei* Schindl. (No. 3913), with unifoliolate leaves, the petiole with a broad foliaceous wing, compensating for the loss of the two lateral leaflets. Although many plants have certain parts much reduced or entirely aborted, there are often compensating organs developed to make up for the reduction.

A Proteaceous tree 20 ft. high in open woodland proved to be *Faurea speciosa* Welw. (No. 3915), with elliptic-lanceolate strongly nerved pubescent leaves and dense spikes of pink flowers with cream lobes. Our camp on Saturday evening 19th July was pitched amongst rather high *Brachystegia* forest, and during the night a gale of wind disturbed our sleep. Before dark we ascended the very fertile valley by a stream, and I was badly pricked by the hairs of *Mucuna* hidden among the long grass, and scared out of the water whilst bathing in a small pool by a vicious-looking water-snake gliding over the surface. A pretty herb by the stream proved to be *Sesamum angolense* Welw. (PEDALIACEAE) (No. 3920), with pink corollas almost like those of a foxglove. A tree growing among rocks was gay with cymes of mauve flowers streaked with carmine, bark papery, leaves pinnate, *Stereospermum Kunthianum* Cham. (BIGNONIACEAE) (No. 3921), and on the edge of the forest² another Bignoniaceous plant, a climber, the well known *Tecomaria capensis* Spach (No. 3922), with dull orange-red flowers.

A climber in the forest was *Vernonia colorata* Drake (COMPOSITAE) (No. 3927), a very widely spread species, with ovate elliptic leaves gland-dotted below, and wide corymbs of white flowers visited by numerous butterflies. A congener was growing nearby, *Vernonia Livingstoniana* Oliv. & Hiern (No. 3928), an erect herb with densely corymbose very small heads of white flowers. It was good to be able to see alive plants of species I had often named in the herbarium.

Here we also found another of those intensely interesting suffruticose species of genera which are normally trees and shrubs, *Tetracera strigillosa* Gilg (DILLENIACEAE) (No. 3931), only 2 ft. high from a woody rootstock, and almost bullate obovate dentate leaves and shining carpels. It formed a thin carpet on the forest floor below the *Brachystegias*.

Another very interesting reduced shrub was *Psychotria* (No. 2932), which seems to be undescribed and which I have named *P. humilis*³

¹ Hutchinson in *Kew Bulletin*, 1931 : 249.

² Also collected : No. 3923, *Eriosema affine* De Wild. (PAPILIONACEAE); 3924, *Dissotis incana* Triana (MELASTOMACEAE); 3925, *Phayloopsis longifolia* T. Thoms. (ACANTHACEAE); 3929, *Crotalaria Johnstonii* Baker (PAPILIONACEAE); 3930, *Blepharis grandis* C.B. Cl. (ACANTHACEAE); 3933, *Turraea robusta* Gürke (MELIACEAE); 3935, *Canthium crassum* Hiern (RUBIACEAE); 3936, *Bersama suffruticosa* von Brehm. (MELIANTHACEAE); 3937, *Isobertlinia doka* Craib (CAESALPINIACEAE); 3938, *Strophanthus* sp. near *S. sarmentosus* DC. (APOCYNACEAE); 3939, *Cremaspora africana* Benth. (RUBIACEAE).

³ *Psychotria humilis* Hutch. sp. nov.

Rhizoma crassum, lignosum, contortum; caules breves, usque ad 0.75 m. alti, robusti, molliter et breviter pubescentes, nodis paucis. Folia obovata vel elliptico-obovata, apice rotundata et obtuse mucronata, basi cuneata vel sensim attenuata, 8–16 cm. longa, 3.5–10 cm. lata, chartacea, supra leviter scabridula,

because of its low stature; our specimens were in fruit, but flowering material has been collected by Milne-Redhead in the Mwinilunga district, and a fruiting specimen by Eyles at Mufulira.

A coffee-like plant with narrowly elliptic leaves and axillary clusters of pinkish flowers proved to be *Tricalysia nyassae* Hiern (RUBIACEAE) (No. 3934), a fairly common species and rather widely spread.

Next morning we started early on our last stage to Lake Tanganyika, the road a gradual descent through picturesque forest scenery. At about 3 miles farther on the road was a *Protea*, *P. denudata* Hutch. & E.A. Bruce (PROTEACEAE) (No. 3942) (see p. 492), a shrub 10 ft. high, with pale pink flowers, growing in open woodland at 3500 ft. altitude.

Proceeding on our journey, we soon had a magnificent view of Lake Tanganyika, an inland sea with a few islands dotted here and there at the southern end, and a welcome sight to our eyes tired with the endless monotony of the *Brachystegia* forest. By the roadside the more tropical conditions of the lower elevations were apparent by the occurrence of very slender and lofty palms swaying in the wind, and our plant presses were soon filled with species favouring moister conditions.

Among the more conspicuous plants collected (about 17 miles from Abercorn)¹ were *Strophanthus Eminii* Asch. & Pax (APOCYNACEAE) (No. 3943), a shrub 10 ft., with clusters of young ovate softly tomentose leaves, and bunches of white flowers with long crimson appendages to the corolla-lobes. The fruiting carpels are divaricate in pairs, each bayonet-shaped and covered with woolly excrescences. The seeds of several species of *Strophanthus* have been used all over Tropical Africa as a source of arrow-poison, and those of *S. Eminii* have been employed for this purpose in Tanganyika Territory, where it is fairly common.

The drug *Strophanthin* is used as a tonic in affections of the heart, the source of official *Strophanthin* being limited to the seeds of *S. Kombé*; those of *S. Eminii* have also been found to have a pharmacological action very similar to those of *S. Kombé*.²

An elegant small-flowered shrub up to 12 ft. high, with precocious pink flowers giving colour here and there, proved to belong to *Cryp-*

infra in nervis et venulis brevissime setulosis; nervi laterales utrinsecus usque ad 13, arcuati, infra prominentes; petioli 0.5-2 cm. longi, breviter setulosi; stipulae fructu deciduae, late ovato-triungulares, 8 mm. longae, 1 cm. latae, fere glabrae. Cymae multiflorae, pedunculatae, ubique molliter setulosae; bracteae parvae, triangulares, acutae. Calycis lobi triangulares, subacuti, glabri. Corollae tubus latus, 3 mm. longus, extra glaber, intra dense villosus; lobi 6, triangulares, crassi, apice inflexi. Stamina 6, medio corollae inserta; antherae vix exsertae, 1.25 mm. longae. Discus crassus, glaber. Stylus 1.75 mm. longus, bilobatus, glaber. Fructus carnosus, ruber, demum niger, plerumque didymus, 7-8 mm. latus, fere glaber.

Northern Rhodesia: Mwinilunga district; Matouchi Farm, on rocky hillside in partial shade, flowers greenish-yellow, 2nd September, 1930, *Milne Redhead* 1029 (flowering type in Kew Herbarium). Solwezi district, River Meheba, fruit 24th July, 1930, *Milne Redhead* 767. Mufulira, in open forest, berries red, 3rd May, 1934, *Eyles* 8256. 12 miles north-west of Abercorn, 2 ft. with thick woody rootstock, in *Brachystegia* wood, *Hutchinson & Gillett* 3932 (fruiting type in Kew Herbarium).

¹ Also collected: No. 3944, *Ceiba pentandra* Gaertn. (BOMBACACEAE); 3945, *Mangifera indica* Linn. (ANACARDIACEAE); 3946, *Eminia antennulifera* Taub. (PAPILIONACEAE).

² See *Bulletin of the Imperial Institute*, 1935: 176-9.



[Photogr. by the Author, July 1930.]

Our party at the south end of Lake Tanganyika.



[Photogr. : Mrs. Gillett.]

“Tom’s village”, at the south end of Lake Tanganyika; a Papaw tree
in the middle.



Lake Tanganyika !



Island in the lake.

[Photogrs. by the Author.]



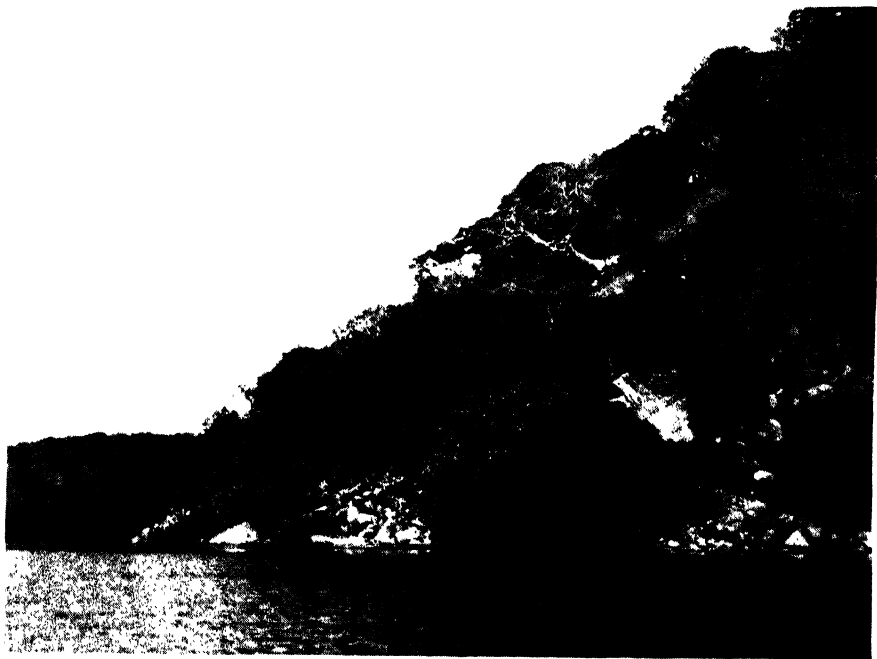
Native canoe.



Boys at Lake Tanganyika.

[Photogrs. by the Author.]

tosepalum, a new species which I named *C. fruticosum* Hutch.¹ *Cryptosepalum* is very close indeed to *Brachystegia*, and when we know more about them they may have to be united. Perhaps there are no better examples of the progressive reduction in habit from trees to herbs with woody rootstocks than in these two genera. *Brachystegias*, except one Angolan species, *B. Russelliae* Johnston, are trees varying in height from 10 to 60 ft., often with a broad and nearly flat spreading top. Species of *Cryptosepalum*, however, are mostly very dwarf, the shoots appearing annually from a woody underground rootstock. Accompanying this change in habit is a corresponding reduction in floral structure,



[Photogr. by the Author.]

Vegetation on the south shore of Lake Tanganyika.

Brachystegia having 5 to sometimes no petals and 15 to 10 stamens, whilst *Cryptosepalum* has only 1 petal and 5, 4 or usually 3 stamens.

On the shore of Lake Tanganyika we were met by Mr. Maxwell, of the African Lakes Corporation, who kindly took our whole party in his motor-boat to botanise on the other side of the lake. There we explored a large and interesting native village, called "Tom's village", where all the inhabitants turned out to see us. Beyond the village are some picturesque falls, and there we collected only two species, *Mussaenda arcuata* Poir. (RUBIACEAE) (No. 3940), a widely spread species with yellow sweet-scented flowers which have not the enlarged calyx-lobes characteristic of the genus as a whole. By the rocky stream-bank were trees 25 ft. high of *Ficus congensis* Engl. (MORACEAE) (No. 3941), with very broadly ovate-orbicular leaves and a cluster of shortly pedunculate figs at the tips of the shoots.

¹ *Kew Bulletin*, 1931: 250, figure on p. 238.

Some photographs here reproduced show our party after landing from the lake, and in the middle of "Tom's village". Returning in the late afternoon by the motor-boat, the "sea" became quite rough, indicating how bad it might be in a real wind storm. Several large crocodiles were lying on the rocks near the shore.

Near the landing-place at Mpulungu a kopje was explored and yielded some interesting specimens,¹ including *Dalbergia lactea* Vatke (PAPILIONACEAE) (No. 3948), a tree 15 ft., with white sweet-scented flowers smelling like peaches, and visited by butterflies; *Landolphia Kirkii* Dyer (APOCYNACEAE) (No. 3949), a climber with small opposite oblong leaves and very small cream-white flowers; *Schrebera trichoclada* Welw. (OLEACEAE) (No. 3951), a tree to 25 ft., with opposite elliptic leaves, and hard woody pear-shaped fruits 5 to 6 cm. long, and winged seeds. Here also we collected a new species of *Acridocarpus* which I have called *A. rufescens* Hutch.² (MALPIGHIACEAE) (No. 3952a).

Most of the bush forest for some miles³ from the lake consisted of scattered *Brachystegia*, a great quantity of *Diplorrhynchus mossambicensis*, *Dalbergia*, *Rhus*, *Vernonia*, *Terminalia*, *Grewia*, *Bauhinia*, etc., and a beautiful red-fruited *Monotes*, which I named *M. obliquinervis* Hutch.⁴ (DIPTEROCARPACEAE) (No. 3963). Here and there were plants of a very large-fruited species of *Uapaca*, *U. Kirkiana* Müll. Arg. (EUPHORBIACEAE) (No. 3959) (see p. 483).

We camped for the night by the Lunzua River, a swift stream where it is crossed by the road, and next morning (21st July) made an early start to explore the country to the south. This was by no means easy owing to the rank grass and other vegetation, including the dreaded *Mucuna*. We soon had enough for our presses, however, and I volunteered to return to camp and get them put away before they withered in the intense heat. In doing so I unfortunately missed seeing the collection of the most interesting plant during the whole trip.

General Smuts and the others had proceeded to explore the mountains to the south, and on top of the escarpment (about 5600 ft.) they discovered a plant which on their return to camp I recognised as a

¹ Also collected : No. 3950, *Pseudolachnostylis maprounifolia* Pax (EUPHORBIACEAE); 3952, *Pterocarpus chrysothrix* Taub. (PAPILIONACEAE); 3953, *Crossopteryx febrifuga* Benth. (RUBIACEAE); 3954, *Diospyros mespiliformis* Hochst. (EBENACEAE); 3955, *Combretum ternifolium* Engl. & Diels (COMBRETACEAE); 3956, *Combretum* sp. (COMBRETACEAE); 3957, *Crotalaria glauca* Willd. (PAPILIONACEAE).

² *Acridocarpus rufescens* Hutch. sp. nov.

Frutex vel arbor parva, ramis junioribus rufescentibus mox glabratis. Folia oblonga vel oblongo-oblancoolata, apice rotundata vel leviter emarginata, basi leviter angustata, 6-8 cm. longa, 1.5-3.5 cm. lata, glabra; nervi laterales utrinsecus circiter 9, a costa sub angulo latissimo divergentes et prominenter conjuncti; petioli 3-4 mm. longi, leviter pubescentes. Racemi terminales, pauciflori, circiter 6 cm. diametro; bractee lanceolatae, 2.5 mm. longae; pedicelli 1.5-2 cm. longi, rufo-pubescentes. Sepala elliptico-rotundata, 4 mm. longa, coriacea, glabra. Petala subsessilia, suborbicularia, 1 cm. diametro, integra vel laciniata. Antherae 6 mm. longae, 2.5 mm. latae. Ovarium leviter rufo-pubescent.

Northern Rhodesia: near Mpulungu, 21st July, *Hutchinson & Gillett* 3952a (type in Kew Herbarium); same locality, *Pole Evans* 3028 (35).

³ Also collected : No. 3958, *Crotalaria sparsifolia* Baker (PAPILIONACEAE); 3960, *Coleus dazo* A. Chev. & Perrot; 3961, *Eriosema psoraleoides* Don (PAPILIONACEAE); 3962, *Barleria nyasensis* C.B. Cl. (ACANTHACEAE).

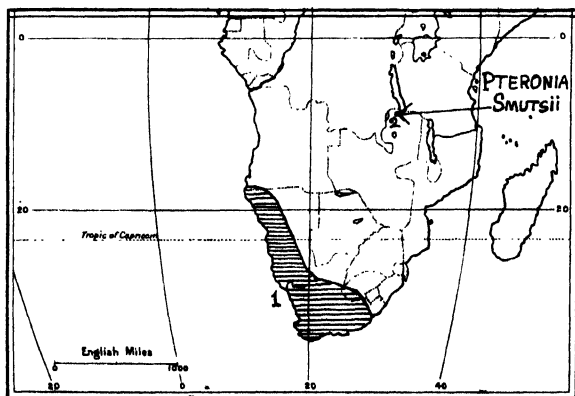
⁴ *Kew Bulletin*, 1931, 247.



[Photogr.: Mrs. Gillett.]

The Lunzua River, near Lake Tanganyika; on the tops of the hills in the background General Smuts discovered the new *Pteronia* (see this page and map).

Pteronia, and I could scarcely believe my eyes. Having published a revision of this almost purely South African genus some years previously, I naturally knew all the species, and realised that this discovery was one of very great phytogeographical interest. As soon as I reached Pretoria I took the opportunity of dissecting the plant, which proved beyond doubt to be a *Pteronia*, and I named it *Pteronia Smutsii*,¹ in



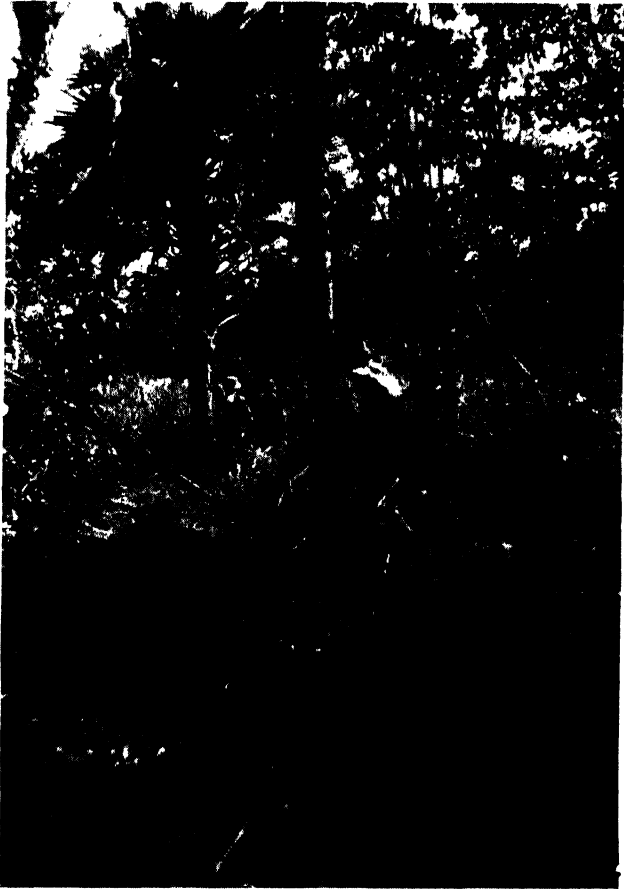
Shaded area 1, showing the distribution of the genus *Pteronia* before the discovery of 2, *Pteronia Smutsii* Hutch., on a mountain top south of Lake Tanganyika.

¹ *Kew Bulletin*, 1931: 240, 250, with fig.



Pteronia Smutsii Hutch. (COMPOSITAE) (see p. 521).

A, leaf; B, lower surface of leaf; C, disk flower; D, stamen; E, pappus, with seta enlarged; F, style-arms. (Drawn by S. Ross-Craig.)



[Photogr. : Mrs. Gillett.]

We treaded softly on the fresh tracks of buffalo in the Lunzua Valley, Northern Rhodesia.

honour of our leader. The discovery of this genus on these mountains adds one more example of South African genera such as *Protea*, which have migrated northwards along the eastern mountains. As may be seen on the sketch map, *Pteronia Smutsii* is separated from its congeners by over 1000 miles, and is a very distinct species (see figure, p. 522). If this had been the only plant collected, our expedition would not have been in vain !

In the neighbourhood of the Lunzua River we made a good collection,¹ including an apparently undescribed species of *Maerua* (CAP-

¹ Also collected : No. 3965, *Stereospermum Kunthianum* Cham. (BIGNONIACEAE); 3967, *Lannea edulis* (Sond.) Engl. (ANACARDIACEAE); 3969, *Vernonia karongensis* Bak. (COMPOSITAE); 3970, *Acacia arenaria* Schinz. (MIMOSACEAE); 3972, *Turraea Randii* Bak. f. (MELIACEAE); 3978, *Pachystele cinerea* Pierre (SAPOTACEAE); 3980, *Pseuderanthemum tunicatum* (Afz.) Milne-Redhead (ACANTHACEAE); 3981, *Pseudospondias microcarpa* Engl. (ANACARDIACEAE); 3982, *Pavetta neurophylla* S. Moore (RUBIACEAE); 3983, *Buchnera Henriquesii* Engl. (SCROPHULARIACEAE); 3984, *Ficus exasperata* Vahl (MORACEAE); 3985,

PARIDACEAE) (No. 3964), a small shrub with trifoliolate leaves and small few-flowered racemes; a striking species of *Loranthus*, *L. proteicola* Engl. (LORANTHACEAE) (No. 3966), growing on *Bauhinia*, with ovate, subcordate leaves, and very villous sulphur-yellow flowers, the claws of the segments red inside, and the ripe berries bright blue-green.

On top of a kopje were striking plants of *Aeschynomene nyassana* Taub. (PAPILIONACEAE) (No. 3968), about 6 ft. high, with setose branches, and long-stipitate fruits with one or two broadly semi-lunar segments.

By the river we again collected the dwarf *Ficus verruculosa* Welw. (MORACEAE) (No. 3971), seen near Zimbabwe (see p. 471), and among the long grass was a striking dwarf *Combretum*, *C. Oatesii* Rolfe (COMBRETACEAE) (Nos. 3974 and 4989), with a thick gnarled rootstock, and brilliant red flowers; this is another example of extreme reduction in habit from arborescence to suffrutescence. Here also were further fine examples of our new *Ochthocosmus Gillettae* Hutch. (ERYTHROXYLACEAE) (No. 3975).

A bright splash of colour was made by *Cassia Petersiana* C. Bolle (CAESALPINIACEAE) (No. 3977), a small tree with yellow flowers, but leafless at this time.

Only a few plants¹ were gathered until we reached the gully where we had first found the new *Ochthocosmus Gillettae* (8 miles north-west of Abercorn, 4400 ft.). Among these² was a striking species of *Crossandra* (No. 3998), with elongate broadly oblanceolate leaves, and shortly pedunculate "fox-tails" of lemon-yellow flowers. This has since been described as *Crossandra sulfurea* G. Tayl.³ It grew here and there among grass on the sides of the gully.

Pterocarpus chrysothrix Taub. (PAPILIONACEAE); 3987, *Euphorbia matabelensis* Pax (EUPHORBIACEAE); 3988, *Coleus scaposus* C.H. Wright (LABIATAE); 3990, *Floscopa rivularis* C.B. Cl. (COMMELINACEAE); 3991, *Emilia sagittata* DC. (COMPOSITAE); 3992, *Pteleopsis anisoptera* Engl. & Diels (COMBRETACEAE); 3993, *Combretum Zyeheri* Sond.; 3989, *C. Gatesii* Rolfe (COMBRETACEAE).

¹ Collected: No. 3994, *Diospyros Kirkii* Hiern (EBENACEAE); 3994a, *Combretum laeteviride* Engl. & Gilg (COMBRETACEAE); 3995, *Bonamia Hildebrandtii* Hall. f. (CONVOLVULACEAE); 3996, *Strophanthus Welwitschii* (Baill.) K. Schum.

² Also collected: No. 3997, *Thunbergia alata* Bojer (ACANTHACEAE); 3999, *Dicoma anomala* Sond. (COMPOSITAE); 4000, *Justicia nyassana* Lindau (ACANTHACEAE); 4001, *Grumilea succulenta* (Schweinf.) Hiern (RUBIACEAE); 4002, *Anthospermum* sp. (RUBIACEAE); 4003, *Helichrysum angustifrons* deum S. Moore (COMPOSITAE); 4004, *Monechma monechmoides* (S. Moore) (ACANTHACEAE); 4005, *Justicia salviodes* Milne-Redhead (ACANTHACEAE); 4008, *Aeschynomene recta* N.E. Br. (PAPILIONACEAE); 4009, *Thesium subaphyllum* Engl. (SANTALACEAE); 4010, *Rhus schinoides* Hutch. (ANACARDIACEAE) (see below *); 4010a, *Barleria lateralis* Oberm. (ACANTHACEAE); 4011, *Dombeya tanganyikensis* Baker (STERCULIACEAE).

³ G. Taylor in *Journ. Bot.* 1933: 165.

* *Rhus schinoides* Hutch. sp. nov.

Frutex 3 m. altus; ramuli breves, hornotini brunnei-purpurascens, verrucosi. Folia trifoliolata; petioli usque ad 5 cm. longi, supra plani, glabri; foliola late elliptico-obovata, apice rotundata et mucronata vel late emarginata, terminale basi cuneata, lateralibus basi rotundatis, usque ad 9 cm. longa et 5 cm. lata, glabra, utrinque conspicue nervosa, nervis lateralibus utrinsecus usque ad 15 patulis marginem versus furcatis. Flores non visi. Infructescensae paniculatae, axillares, foliis breviores, breviter pubescentes; pedicelli 2-3 mm. longi. Fructus subglobosus, nitidus, 5-6 mm. diametro, flavo-viridis.

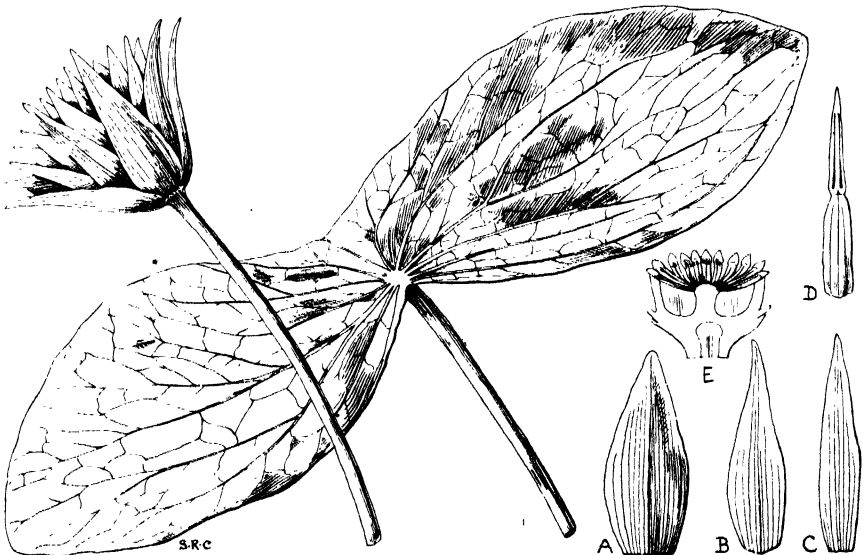
Northern Rhodesia: 8 miles north-west of Abercorn, near stream in gorge, 10 ft. high, fruits yellow-green, *Hutchinson & Gillett* 4010 (type in Kew Herbarium).



[Photogr. : Mrs. Gillett, July 1930.]

Jan Gillett and the Author pressing plants near Lake Tanganyika.

Another white-flowered tree besides the *Occhocismus* was *Dombeya rotundifolia* Harv. (STERCULIACEAE) (No. 4007), 20 ft. high, with orbicular cordate leaves. A second species grew quite near, *D. tanganyikensis* Baker (No. 4011), with trilobed cordate leaves and larger flowers, but only 8 ft. high.



Nymphaea divaricata Hutch., with peculiar submerged bilobed leaves.

A, sepal; B, petal; C, inner petal; D, stamen; E, vertical section.

Here among the grass was a very dwarf *Geissaspis* (PAPILIONACEAE), with the leaflets reduced to a tiny pair. I have described this below as *G. minima* Hutch.¹ new species.

Between this spot and Abercorn a few species² were gathered, and other plants³ here and there between Abercorn and our interesting swamp about 6 miles north-east of Kasama, where we had seen the lovely *Coleus mirabilis* Briq. on our journey northward. Here there was a fair-sized stream with delightful pools at intervals, in which we all enjoyed a refreshing dip.

¹ *Geissaspis minima* Hutch. sp. nov.

Suffrutex parvus, e rhizomate lignoso ortus; caules fere e basi ramosi, graciles, teretes, glabri. Folia bifoliolata; foliola minima, oblique obovata, apice rotundata, basi unilateraliter rotundata, 5-7 mm. longa, glauca, glabra, nervis e basi radiatis multe ramosis; petioli 5 mm. longi, infra leviter denticulata, apice subulato-producti; stipulae foliaceae, obovatae, basi cordatae, 4-5 mm. longae, e basi multinervosae. Inflorescentiae laxae strobiliformes circiter 2 cm. longae, breviter pedunculatae; bracteae rubescentes, late rotundatae, fere 1 cm. diametro, integrae sed superiores interdum bilobatae. Calycis lobi lanceolati, 5-6 mm. longi. Corolla non visa. Fructus late stipitatus, monospermus, rotundatus, rostratus, 5 mm. latus, glaber.

Northern Rhodesia: 8 miles north-west of Abercorn, 5300 ft., dwarf shrublet from a woody rootstock, bracts reddish, July 1930, *Hutchinson & Gillett* 4006 (type in Kew Herbarium); same place and time, *Pole Evans* 2998/5.

² Collected: 4013, *Vernonia denudata* Hutch. & B.L. Burtt (COMPOSITAE); 4014, *Euphorbia cyparissoides* Pax (EUPHORBIACEAE); 4015, *Dicoma pygmaea* Hutch. sp. nov. (see below) (COMPOSITAE); 4016, *Hypoxis obtusa* Burch. (HYPOXIDACEAE).

Dicoma pygmaea Hutch. sp. nov., affinis *D. nanae* Welw. ex Hiern sed foliis angustioribus et capitulis majoribus latioribusque differt.

Herba perennis, pygmaea, acaulescens. Folia rosulata, obovata vel oblanceolata, ad basin subamplexicaulem nervosum sensim angustata, apice subacuta, 10-15 cm. longa, 2-5 cm. lata, supra glabra, laxe et conspicue reticulata, infra albo-lanata; nervi laterales 5, e basi ascendentes, supra prominentes. Capitula sessilia, solitaria vel usque ad 4-nata, circiter 4 cm. diametro. Involucri bracteae albae, 9-10-seriatae, gradatim longiores, late lanceolatae, sensim et acute acuminatae, minute ciliatae, interiores 3 cm. longae. Flores flavo-brunnei. Corolla 1 cm. longa; lobi lineares, 5 mm. longi. Achaenia 3 mm. longa, dense villosa. Pappus plumosus, 8 mm. longus.

Northern Rhodesia: Aeroplane landing 2 miles north-west of Abercorn, 5300 ft., bracts white, flowers yellow brown, visited by butterflies, 22nd July, 1930, *Hutchinson & Gillett* 4015; same locality, *Pole Evans* 3007; between Mbeya and Chunya 8000 ft., on burnt mountain grassland, 7th September, 1936, *B.D. Burtt* 6253; Chilanga, 20 miles north of the Kafue River, 10th October, 1909, *F.A. Rogers* 8528 (type in Kew Herbarium); near Mumbwa, *Gairdner* 803; "Granite Siding" between Choma and Pemba, 17th August, 1929, *Burtt Davy* 714.

Nyasaland: Nyika Plateau, 8000 ft., September 1902. *McClounie* 67.

Tanganyika Territory: Iringa Province; Mbozi, 5000 ft., 28th August, 1933, *Greenway* 3623; Msoma Stock farm, 5400 ft., 11th August, 1933, *Greenway* 3541.

³ Collected at 7 miles south of Abercorn: No. 4017, *Inula shirensis* Oliv. (COMPOSITAE); 4018, *Afrormosia angolensis* (Bak.) Harms (PAPILIONACEAE). At 9 miles south of Abercorn: No. 4019, *Tripteris monocephala* O. & H. (COMPOSITAE); 4020, *Zornia diphylla* Pers. (PAPILIONACEAE); 4021, *Crotalaria diloboensis* Bak. f. (PAPILIONACEAE); 4022, *Erlangea eupatorioides* Hutch. & B.L. Burtt. (COMPOSITAE); 4023, *Pycnostachys Prittwitzii* Perk. (LABIATAE); 4024, *Borreria senensis* (Hiern) K. Schum. (RUBIACEAE); 4025, *Gnidia mollis* C.H. Wright (THYMELAEACEAE); 4026, *Polygala usafuensis* Gürke (POLYGALACEAE); 4027, *Rubia cordifolia* Linn. (RUBIACEAE); 4028, *Crotalaria striata* DC. (PAPILIONACEAE); 4029, *Cassytha filiformis* Linn. (LAURACEAE); and at 35 miles south of Abercorn, 4030, *Arthrosolen chrysanthia* Solms Laub. (THYMELAEACEAE).



Formidable
looking ladies
somewhere in
Central Africa.



By the way-
side in North-
ern Rhodesia.

[Photogrs. by the Author.]

Whilst swimming I observed a *Nymphaea* with only the pale-blue flowers showing on the surface of the water. About 2½ ft. below, however, was a carpet of remarkable very thin bilobed leaves (see figure, p. 525). It seemed to be growing under quite happy and normal conditions, and no specimens with floating leaves were observed. This is the first species to be found in Tropical Africa with all the leaves submerged; the same characteristic has been recorded for *N. oxypetala* Planch. from Ecuador, *N. amazonum* forma *submersa* Sagot, and occasionally for *N. alba* Presl. I named the new species *N. divaricata* Hutch. (NYMPHAEACEAE) (No. 4045), with reference to the divaricately lobed leaves (*Kew Bulletin*, 1931, p. 235).

The more striking plants¹ in the swampy ground by this river were an Iris-like plant, *Morea zambesiaca* Baker (No. 4032), with purple flowers; *Craterostigma Schweinfurthii* Engl. (SCROPHULARIACEAE) (No. 4034), a slender herb 1½ ft., with opposite sessile slightly dentate leaves and a terminal small cluster of blue flowers; *Polygala ruwenzoriensis* Chod. (POLYGALACEAE) (No. 4053), a shrub 5 ft., with bracteate racemes of pink flowers.

There were several species of *Utricularia* (LENTIBULARIACEAE), *U. Welwitschii* Oliv. (No. 4036), very common, the flowers purple with a yellow centre and very variable in size of flower; *U. reflexa* Oliv. (No. 4044), with solitary reflexed deep yellow flowers, not common; *U. subulata* L. (No. 4049), fairly common, a delicate little plant with very zigzag inflorescences of small deep yellow flowers. Here I was delighted to find numerous examples of the genus *Genlisea*, also belonging to *Lentibulariaceae*. Besides Africa the genus occurs also in tropical America, from British Honduras and Cuba to the Guianas and Brazil. One of the Brazilian species, *G. reflexa* Benj., shows close affinity with *G. africana* Oliv., which is found on the opposite side of the Atlantic from Sierra Leone south to Angola.

At 33 miles north-east of Broken Hill (see p. 496), in a bog, we had collected (No. 3644) a species of this interesting genus which differs from all the other known African species in having pale greenish-yellow flowers. This I have called *G. subviridis*.²

¹ Also collected (6 miles N.E. of Kasama): No. 4031, *Smithia strobilantha* Welw. (PAPILIONACEAE); 4033, *Eriocaulon Schimperii* Koernicke (ERIOCAULACEAE); 4037, *Drosera madagascariensis* DC. (DROSERACEAE); 4038, *Xyris multicaulis* N.E. Br. (XYRIDACEAE); 4039, *Drosera Burkeana* Planch.; 4041, *Utricularia Baumii* (LENTIBULARIACEAE); 4044, *Utricularia reflexa* Oliv. (LENTIBULARIACEAE); 4046, *Ottelia cylindrica* (T.C.F. Fr.) Dandy (HYDROCHARITACEAE); 4047, *Blyxa radicans* Ridl. (HYDROCHARITACEAE); 4051, *Canthium venosum* (Oliv.) Hiern (RUBIACEAE); 4052, *Combretum brachypetalum* R.E. Fries (COMBRETACEAE); 4054, *Eriocaulon zambesiense* Ruhl (ERIOCAULACEAE); 4055, *Lycopodium cernuum* L. (LYCOPODIACEAE).

² *Genlisea subviridis* Hutch. sp. nov. affinis *G. africanae* Oliv. sed floribus pallide flavo-viridibus, foliis multo majoribus differt.

Herba 20–30 cm. alta; caules superne ramosi, glabri, virides. Folia spatulato-oblancoolata, ad basin longe attenuata, apice truncato-rotundata, 2·5 cm. longa, 5–6 mm. lata, glabra. Flores pallide flavo-virides; pedicelli fere 1 cm. longi, fructu 1·5 cm. longi apicem versus glanduloso-pilosis; bracteae triangulares, glanduloso-pubescentes. Calycis segmenta lanceolata, extra glanduloso-hispida. Corolla 7 mm. longa, labio superiore ovato 2 mm. longo, labio inferiore cum calcare lato leviter glanduloso 7 mm. longo. Ovarium parce glanduloso-pubescent. Capsula globosa, parce pubescens.

Northern Rhodesia: 33 miles north-east of Broken Hill, in bog by side of Great North Road, flowers pale greenish-yellow, 14th July, 1930, *Hutchinson & Gillett* 3644 (type in Kew Herbarium).

In a bog at 6 miles north of Kasama we also collected further specimens of the genus, a dwarf species (No. 4035) covered all over with yellow viscid-glandular hairs, and pale-blue flowers. It was quite common at this spot, and proves to be *Genlisea glandulosissima* R.E. Fries.

Growing in separate patches was another species (No. 4050) which proves to be undescribed, and which I have much pleasure in calling *G. Margaretæ*,¹ after Mrs. Margaret Gillett (see p. 451). This was three



[Photogr. by the Author.]

Some of our party near Abercorn; Dr. Pole Evans photographing from the top of his lorry-caravan.

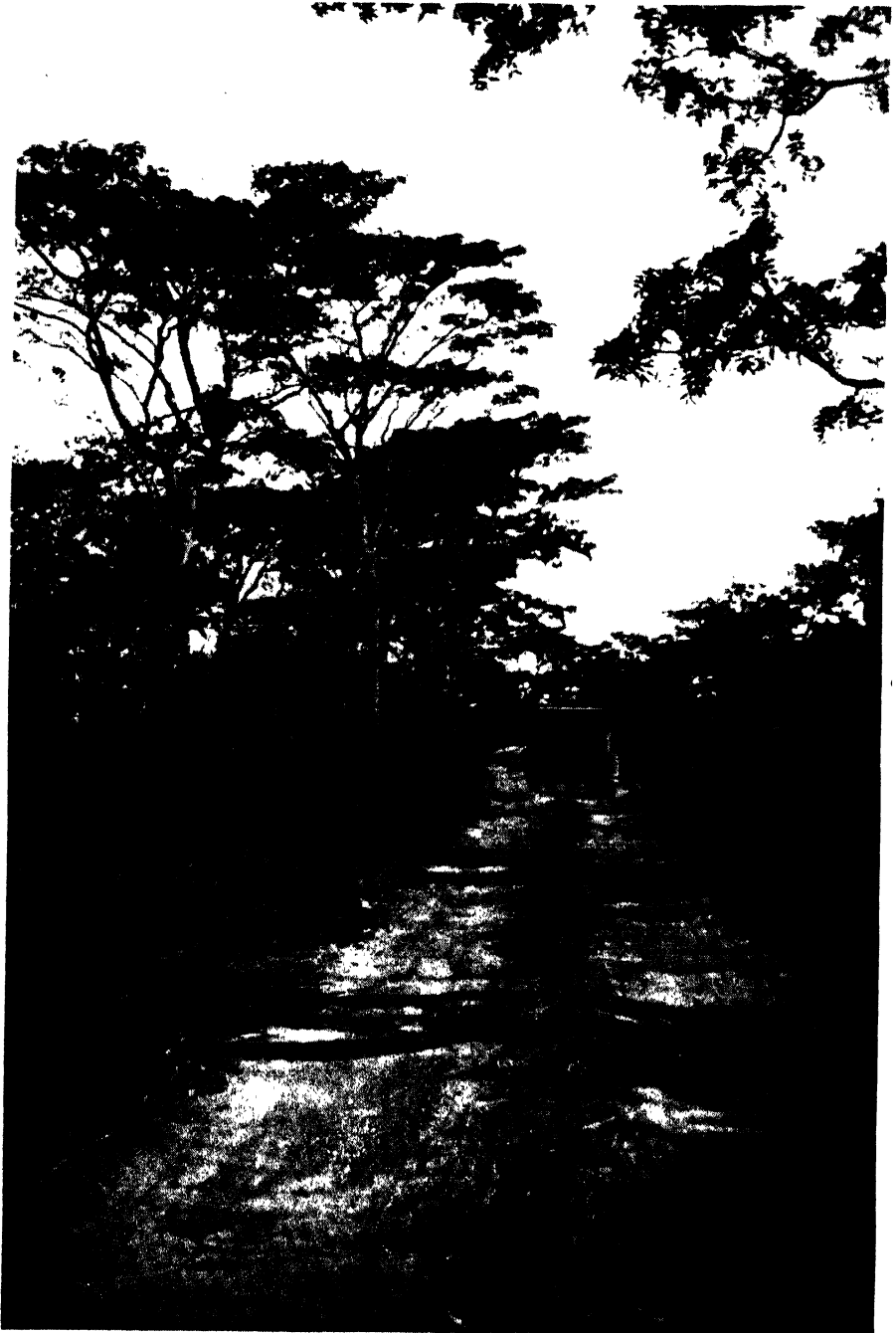
times as tall as *G. glandulosissima*, glandular-pubescent only towards the top, and with dark blue flowers.

Scattered between these two distinct species were a few plants (No. 4042) of an obvious hybrid, intermediate in stature, glandular pubescent, and with dark blue flowers.

¹ *Genlisea Margaretæ* Hutch. sp. nov. affinis *G. hispidulae* Stapf, sed altior, parco glanduloso-pubescent differt.

Herba 20–30 cm. alta; caules simplices, leviter flexuosi, satis robusti, parvisime glanduloso-pubescentes, bracteis ovato-triangularibus subacutis gerentes. Folia dense rosulata, spatulata, .4 cm. longa, 4–5 mm. lata, apice truncato-rotundata; utriculi numerosi, longe petiolati, ramis 1 cm. longis spiraliter tortis. Bractee anguste ovatae, glanduloso-pubescentes; pedicelli brevissimi, fructu recurvi, 4 mm. longi. Calycis segmenta late lanceolata, 1.5 mm. longa, glanduloso-pubescentia. Corolla 6 mm. longa, labio superiore 1.5 mm. longo, calcare angusto 3 mm. longo. Capsula globosa, breviter glanduloso-pubescent.

Northern Rhodesia: 6 miles north of Kasama, 4100 ft., in bog by side of Great North Road, flowers dark blue, 23rd July, 1930, *Hutchinson & Gillett* 4050 (type in Kew Herbarium).



[Photogr. : Mrs. Gillett.]

Road through the *Brachystegia* forest between Abercorn and Lake Tanganyika.



[Photogr. by the Author.]

The petrol tin is put to many uses in Central Africa.

Between Kasama and Broken Hill we collected at various points. At 59 miles south of Kasama ¹ we put into our presses *Ficus congensis* Engl. (MORACEAE) (No. 4058) (see p. 519), a tree 20 ft., with broadly ovate-elliptic leaves and axillary shortly stalked figs, a fern, *Dryopteris Thelypteris* (L.) A. Gray, var. *squamigera* Schlecht. (No. 4057), and the common Scabious, *Scabiosa Columbaria* Linn. (DIPSACACEAE) (No. 4059), with white flowers, and no different, apparently, from the species as it occurs in the north temperate zone.

At 52 miles north of Mpika (4000 ft.), we gathered *Nidorella Welwitschii* S. Moore (COMPOSITAE) (No. 4060), with linear leaves scabrid above and small corymbs of yellow flower heads, and 30 miles south of Mpika, *Vernonia glabra* Vatke (COMPOSITAE) (No. 4061), 4 ft., with lanceolate dentate leaves, and wide corymbs of purple flowers much visited by white butterflies, and a new species of *Erlangea*, *E. eupatorioides* Hutch. & B.L. Burtt,² an erect herb, 7 ft. high, with sharply serrate opposite lanceolate-elliptic leaves and close corymbs of deep mauve flower-heads.

At Kaloswe ³ (39 miles south-east of Mpika), we made a fair collec-

¹ Also collected: No. 4056, *Merremia pterygocaulis* Hall. f. (CONVOLVULACEAE).

² Hutch & B.L. Burtt in *Rev. Zool. & Bot. Afr.*, 23 : 36 (1932).

³ Also collected: No. 4063, *Brachystegia* sp. (CAESALPINIACEAE); 4064, *Tephrosia noctiflora* Bojer (PAPILIONACEAE); 4065, *Barleria crassa* C.B. Cl. (ACANTHACEAE); 4066, *Crotalaria lanceolata* E. Mey. (PAPILIONACEAE); 4067, *Utricularia Welwitschii* Oliv. (LENTIBULARIACEAE); 4068, *Vepris reflexa* Ver-



[Photogr. by the Author.]

The lorry-caravan in difficulties south of Abercorn.

tion amongst the granite kopjes near the road. Amongst these the more interesting were a new species of *Aeschynomene* which I have described below¹ as *A. semilunaris* Hutch. (PAPILIONACEAE) (No. 4074), with reference to the 1-seeded semilunar fruits.

At 32 miles north-east of Serenje Corner² (25th July), 5200 ft. alt., *Diplolophium zambesianum* Hiern (UMBELLIFERAE) (No. 4075) (see p.

doorn (RUTACEAE); 4069, *Tricalysia* sp. (RUBIACEAE); 4070, *Apodytes dimidiata* E. Mey. (OLACACEAE); 4071, *Polystachya miranda* Kranzl. (ORCHIDACEAE); 4072, *Anisopappus angolensis* O. Hoffm.; 4073, *Coleus thyrsoides* Bak. (LABIATAE); 4074, *Aeschynomene semilunaris* Hutch. n. sp. (PAPILIONACEAE).

¹ *Aeschynomene semilunaris* Hutch. sp. nov. fructu semilunari 1-spermo distincta.

Frutex 2.5 m. altus; ramuli abbreviati, lenticellis conspicuis notati, juniores foliati et pubescentes. Foliola circiter 8-juga, parva, oblonga vel oblongo-elliptica, utrinque rotundata, basi inaequalia, 7-8 mm. longa, 3.5 mm. lata, brevissime et parce ciliata, nervis ascendentibus; rhachis pubescens; stipulae mox deciduae, foliaceae, ellipticae, 7 mm. longae, nervis e basi ascendentibus. Racemi breves, pauciflori; bracteae caducae, cymbaeformes, 6 mm. longae, glabrae; pedicelli usque ad 5 mm. longi, pubescentes. Calycis lobi 7 mm. longi, glabri. Petala circiter 1 cm. longa. Ovarium stipitatum, glabrum. Fructus semilunaris, 1-spermus, stipitatus, 1.5 cm. longus, 8 mm. latus, glaber, leviter venosus.

Northern Rhodesia: Kaloswe, 4000 ft., shrub 8 ft., flowers yellow, 24th July, 1930, *Hutchinson & Gillett* 4074 (type in Kew Herbarium).

² Also collected: No. 4076, *Smithia aeschynomenes* Welw. (PAPILIONACEAE); 4079, *Vernonia Buchananii* Baker (COMPOSITAE); 4080, *Selago* sp. (SELAGINACEAE); 4081, *Cluytia abyssinica* Jaub. & Spach (EUPHORBIACEAE); 4082, *Anthospermum Whyteanum* Britt. (RUBIACEAE); 4083, *Euphorbia strangulata* N.E. Br.

483) was very common, as nearly everywhere on the floor of the *Brachystegia* forest; a striking Acanthaceous plant, *Strobilanthis linifolia* (T. Ands. ex C.B.Cl.) M. Redhead (No. 4077), a shrublet 2 ft. high, with pale-mauve flowers, and common on the kopjes here and there; and a neat shrub, 8 ft. high, of a new species of *Tricalysia* (RUBIACEAE) which I have named *T. revoluta* Hutch.¹ (No. 4078), because of the revolute leaves tomentose below.

At 42 miles² south-west of Serenje Corner we gathered a few more plants, at 18 miles north-east of Chiwefwe,³ 4500 ft., and at 4 miles west of Chiwefwe,⁴ and this completed our collecting as a party, because I was due to stop at Broken Hill and pay a short visit to the Belgian Congo, which I was eager to see.

We arrived at Broken Hill on Saturday morning, 26th July, and I put up at the hotel. The rest of the party set off at once for Pretoria, and, as at Durban, I felt very much alone after having so many companions. Two days were spent clearing the presses and sending the dried and half-dried specimens off by post to Pretoria.

Short Trip to Katanga, Belgian Congo

On Monday evening, 28th July, I left Broken Hill by a goods train for Elizabethville, arriving at the frontier station at Sakania early the next morning. Sakania is not an attractive place to stay at even for one day, especially as the flora of the forest round about was in every way very similar to that seen for the last two or three weeks. I took a couple of boys with me, and penetrated into the forest a few miles, but found little to collect.⁵ The termite heaps in the neighbourhood were covered, not with *Euphorbia* and other spiny plants, as they had been towards Tanganyika, but by a dense growth of a fine Bamboo, *Oxytenanthera abyssinica* Munro (GRAMINEAE) (No. 4094). Near the station was a striking tree of *Ficus brachylepis* Welw. (MORACEAE) (No.

¹ *Tricalysia revoluta* Hutch. sp. nov. foliis infra molliter tomentellis marginibus valde revolutis distincta.

Frutex 3 m. altus, multiramis; ramuli hornotini breves, molliter tomentelli. Folia elliptica, basi subacuta, apice obtusa, 2-2.5 cm. longa, 1-1.5 cm. lata, supra costa media breviter pubescenti excepta glabra, infra molliter tomentella, marginibus valde revolutis; petioli 2 mm. longi, tomentelli; stipulae e basi lato subulatae, breviter pubescentes. Flores alabastro tantum visi, fere sessiles, fasciculati, cinereo-tomentosi; bractae cupulatae, denticulatae. Calyx dentatus, 2 mm. longus, appresse tomentosus.

Northern Rhodesia: 32 miles north-east of Serenje Corner, 5200 ft., 25th July, 1930, *Hutchinson & Gillett* 4078 (type in Kew Herbarium); *Pole Evans* 2883 (40); hills 24 miles north of Chitambo, 6th June, 1931, *Stevenson* 313/31.

² Collected: No. 4085, *Senecio brachycephalus* R.E. Fries (COMPOSITAE); 4086, *Bridelia ferruginea* Benth. (EUPHORBIACEAE); 4087, *Acrocephalus oligcephalus* Baker (LABIATAE); 4088, *Myrothamnus flabellifolia* Welw. (MYROTHAMNACEAE).

³ Collected: No. 4089, *Dicoma anomala* Sond. (COMPOSITAE).

⁴ Collected: No. 4090, *Parinari Bequaertii* De Wild. (ROSACEAE); 4091, *Albizzia versicolor* Welw. (MIMOSACEAE); 4092, *Baphia Bequaertii* De Wild.

⁵ Collected near Sakania: No. 4099; *Rutidea obtusata* K. Krause (RUBIACEAE); 4100, *Pavetta neurophylla* S. Moore (RUBIACEAE); 4101, *Polygala tenuicaulis* Chod. (POLYGALACEAE); 4103, *Strobilanthis hircina* S. Moore (ACANTHACEAE); 4105, *Tricalysia suffruticosa* Hutch., n. sp. (see p. 534) (RUBIACEAE); 4106, *Smithia aeschynomenoïdes* Baker (PAPILIONACEAE); 4108, *Bridelia ferruginea* Benth. (EUPHORBIACEAE).

4093), 40 ft. high, with a wide-spreading crown, long-petiolate elliptic leaves, and fascicles of shortly stipitate figs on the old wood.

A bright spot in the otherwise rather dull forest was caused by *Cassia goratensis* Fres. (CAESALPINIACEAE) (No. 4095), a small tree, leafless at flowering time, with bright-yellow flowers. A more sombre colour was provided by *Loranthus erianthus* Sprague (LORANTHACEAE) (No. 4096), growing on Acacia, with dull-red flowers, the limb of the corolla with a green tip.

A small bush with caterpillar-like inflorescences, bifoliolate leaves, and very large leafy cordate stipules was *Geissaspis drepanocephala* Baker (PAPILIONACEAE) (No. 4097). A tall slender sapling-like plant 15 ft. high was *Anthocleista inermis* Engl. (LOGANIACEAE) (No. 4102), with long-petiolate elongate-obovate leaves. Another genus which I was pleased to see in the living state was *Chrysophyllum*, *C. argyrophyllum* Hiern (SAPOTACEAE) (No. 4104), with broadly oblanceolate leaves, silvery-silky below. In the scanty herbage of the forest floor *Vernonia Melleri* Oliv. & Hiern (COMPOSITAE) (No. 4107), with narrow scabrid leaves and sky-blue flower-heads was conspicuous, and the boys were anxious for me to take armfuls; and here was an apparently undescribed suffruticose *Tricalysia*¹ in fruit and young flower.

Sakania is the rail-head for the Rhodesian railways, but through coaches on some trains proceed to Elizabethville. I was not sorry to leave next morning, and was rather annoyed with being 3 hours late and having to turn out my pockets to see whether I had enough money to support myself, and to have to give up the revolver which had been lent to me. Discussion was useless, however, and I had to part with it. Although it would probably not have been much use, it had been a great "comfort" to feel it under my pillow each night when sleeping on the ground.

However, here I was in the Belgian Congo! The *Brachystegia* forest continued to be much the same all the way to Elizabethville, and rarely was there any view of the landscape from the train.

¹ *Tricalysia suffruticosa* Hutch. sp. nov. affinis *T. Kirkii* Hiern, sed habitu et foliis oblanceolatis basin versus longe attenuatis differt.

Suffrutex; caules simplices vel parce ramosi, usque ad 0.75 m. alti, e rhizomate lignoso orti, laxè foliati, strigilloso-pubescentes. Folia oblanceolata, apice acuta, ad basin longe attenuata, 5-7 cm. longa, 1.5-3 cm. lata, utrinque leviter setuloso-pubescentia; nervi laterales 5-6, basales sub angulo acuto ascendentes, utrinque prominuli; petioli 4-5 mm. longi, setulosi; stipulae e basi late triangulari subulatae, 4 mm. longae. Flores precocci vel subprecocci, axillares, solitarii vel geminati, sessiles. Bracteae cupulares 2-3, usque ad 3 mm. longae, truncatae et denticulatae, extra appresse pubescentes. Calyx 5 mm. longus, integer, demum irregulariter fissus, extra appresse sericeus. Corollae tubus 1 cm. longus, extra appresse sericeus, intra pilis intricatis dense pubescens; lobi 8, oblongo-oblanceolati, 1 cm. longi, extra breviter pubescentes. Stamina 8; filamenta 1-1.5 mm. longa; antherae exsertae, basifixae, 4.5 mm. longae. Discus carnosus, glaber. Stylus 1.2 cm. longus, breviter bilobatus, superne parce pubescens. Fructus globosus, demum crustaceus et aurantiacus, 1.3-1.5 cm. diametro, calyce persistente coronatus, apicem versus leviter appresse pubescens.

Belgian Congo: Katanga; Sakania, young flower and fruit, August 1930, Hutchinson 4105.

Northern Rhodesia: Solwezi, in *Brachystegia* woodland, 6th June, 1930, Milne Redhead 432 (type for fruits and leaves); same locality, flowers waxy white, 25th September, 1930, Milne Redhead 1199 (type for flowers).

Angola: Malange, Mechow 219.

I collected in the neighbourhood of Elizabethville¹ with the then British Vice-Consul, Mr. von Hirschberg, who was keenly interested in orchids. Together we explored a small river bearing on its banks a kind of forest vegetation quite different from the *Brachystegia* type, with genera represented which are characteristic of the evergreen forests of the Congo. Indeed, these forests extend their arms, like an octopus, in all directions through the drier savannah by means of these innumerable small streams.

A large burnt area some miles from Elizabethville was a beautiful sight, on account of a great quantity of a pale-mauve or pink-flowered species of *Cryptosepalum*, *C. maraviense* Oliv., with dwarf shoots a few inches high. Associated with it was a tiny *Euphorbia*, *E. zambesiana* Benth. (EUPHORBIACEAE) (No. 4129), with conspicuous white involucre glands.

By the stream I met with several old botanical "friends", including *Dracaena camerooniana* Baker (AGAVACEAE) (No. 4115), a trailer with subverticillate oblanceolate leaves, *Antidesma membranacea* Müll. Arg. (EUPHORBIACEAE) (No. 4116), with pendulous spikes of young fruits, *Uapaca zanzibarica* Pax (EUPHORBIACEAE), a small tree with elliptic long-petiolate leaves, *Uapaca Kirkiana* Müll. Arg. (No. 4120), with obovate-cuneate strongly nerved leaves, and one of my own species, *Uapaca pilosa* Hutch. (No. 4121), with very widely obovate pilose leaves.

I left Elizabethville, a rather dusty town in the dry winter months, at nine o'clock in the evening on Sunday, 3rd August, after seeing during the day two football matches, one Rugby, the other Association, and played by almost the same mixed teams, the natives in their bare feet. I had hardly expected to see football in the heart of Africa!

I arrived at Bulawayo on the next Tuesday morning, and from there I paid a short visit to the Matopos, accompanied by Miss Cheeseman, sister of one well known as an explorer. We visited the grave of Cecil Rhodes, and botanised on the kopjes round about. On the granite boulders around the tomb we secured a few living specimens of the very rare *Anacampseros rhodesiaca* N.E. Br. (PORTULACACEAE), which we had recorded for the first time at Matoks, Transvaal, on my former tour. There were several figs, the following being small trees among the rocks: *Ficus rhodesiaca* Warb. (MORACEAE) (Nos. 4134 and 4138), with oblong-oblanceolate leaves and clusters of small very shortly stalked woolly figs; *F. ingens* Miq. (No. 4135), a widely spread species, with deeply cordate oblong-elliptic lanceolate leaves and subsessile glabrous figs; *F. Sonderi* Miq. (No. 4137), with ovate-elliptic slightly cordate leaves long-pilose below, and sessile villous figs; and *F. soldanella* Warb. (No. 4141), with deeply cordate orbicular shortly pubescent leaves, and subsessile glabrous figs, this last being only 2-3 ft. high on rocks.

¹ Also collected: No. 4109, *Tricalysia nyassae* Hiern (RUBIACEAE); 4111, *Trema quineensis* Ficalho (ULMACEAE); 4112, *Parinari Mobola* Oliv. (ROSACEAE); 4113, *Tricalysia myrtifolia* S. Moore (RUBIACEAE); 4114, *Craibea affinis* De Wild. (PAPILIONACEAE); 4117, *Gymnosporia* sp. (CELASTRACEAE); 4119, *Anthericum* sp. (LILIACEAE); 4122, *Bulbophyllum* sp. (ORCHIDACEAE); 4123, *Anisophyllea Gossweileri* Engl. & von Brehm. (RHIZOPHORACEAE); 4124, *Chrysophyllum Argyrophyllum* Hiern. (SAPOTACEAE); 4125, *Loranthus Braunii* Engl. (LORANTHACEAE); 4126, *Combretum Gossweileri* Exell (COMBRETACEAE); *Tinnea caerulea* Gürke (LABIATAE), and *Senecio Rogersii* S. Moore (COMPOSITAE).

Other small trees were *Pseudolachnostylis maprouneifolia* Pax (EUPHORBIACEAE) (No. 4133), *Euclea multiflora* Hiern (EBENACEAE) (No. 4132), with oblong-ob lanceolate pubescent leaves and axillary clusters of small hairy flowers; and *Olea chrysophylla* Lam. (OLEACEAE) (No. 4136), leaves oblanceolate, acute, finely lepidote below.

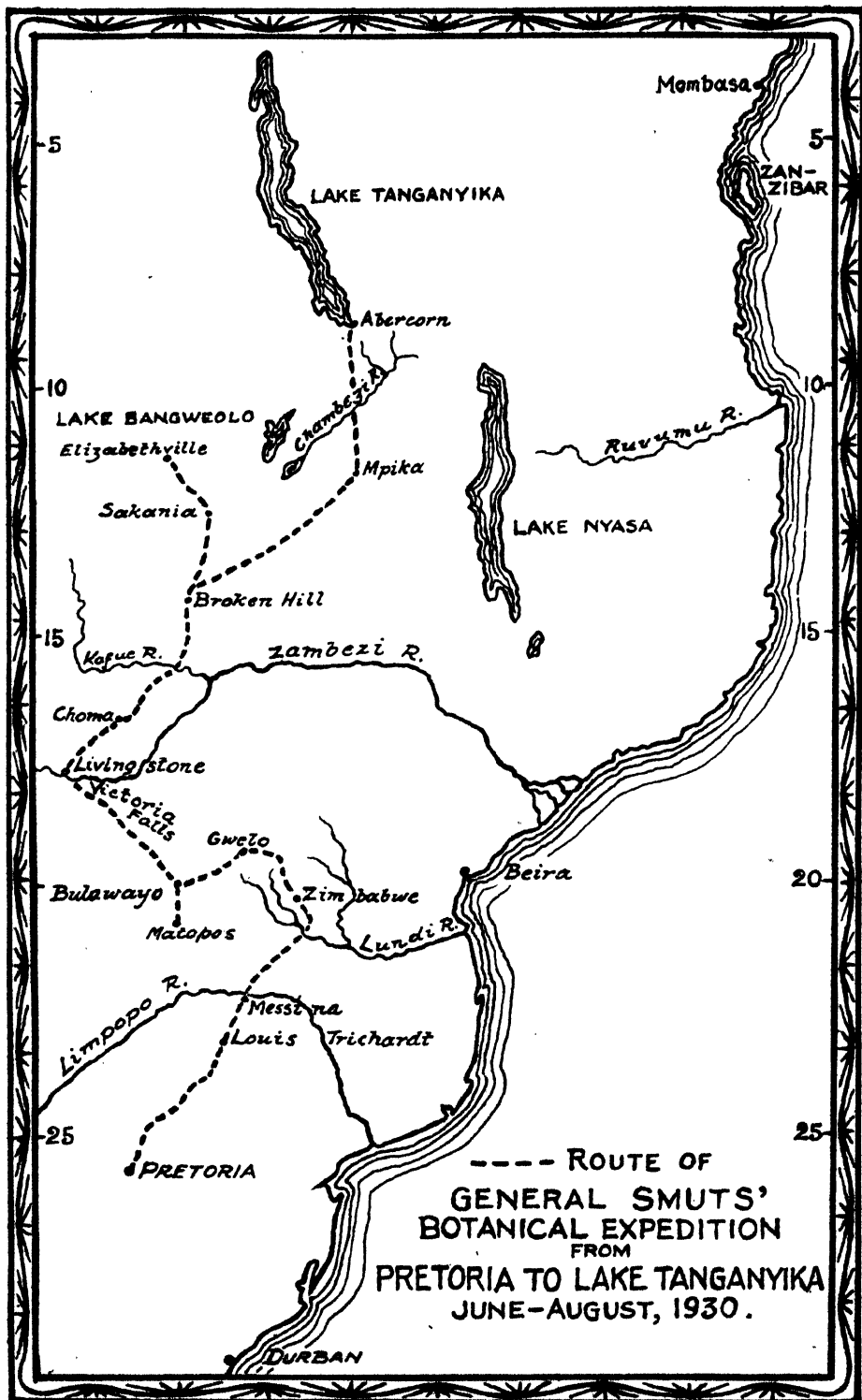
Shrubs were *Tarchonanthus camphoratus* Linn. (COMPOSITAE) (No. 4131); *Euclea lanceolata* E. Mey. (EBENACEAE), leaves very narrowly oblanceolate, flowers nearly glabrous; *Sutera Burkeana* (Benth.) Hiern (SCROPHULARIACEAE), with fascicles of small toothed leaves and mauve tubular flowers; and *Rhus lancea* Linn. (ANACARDIACEAE) (No. 4140), with trifoliolate leaves and linear-lanceolate leaflets, and there was a dwarf fleshy *Euphorbia* (No. 4142), which I have not been able to name.

From Bulawayo I returned by rail to Pretoria in order to arrange for the despatch of the collections to Kew. They had been well cared for at the National Herbarium.

As I still had some time to spare, with General Smuts' approval Mr. Jan Gillett and I set off on the 16th August for a week's botanising in the Zoutpansberg, Mrs. Gillett generously allowing the use of her car for the purpose. The Forestry Department at Pretoria very kindly informed their officers of our intended visit and we received much help and kind hospitality from them. I have given an account of this interesting trip on p. 344, following the notes made on our previous visit to these fascinating mountains in December 1928.

On reaching Pretoria, on my return from the Zoutpansberg, I left almost immediately for Natal, in order to visit the National Park and the Mont aux Sources, an account of which is also given earlier in the book (p. 278). From Durban I sailed for Port Elizabeth, where I enjoyed a week with a former colleague at Kew, Mr. F. R. Long (see p. 242), and we botanised at various places round about, including Hankey, where the most striking plants were very large examples of the Elephant's Foot, *Testudinaria Elephantipes*, living samples of which were procured for Kew.

From Port Elizabeth I returned by sea to Cape Town, and thence home again, after a wonderful and never-to-be forgotten experience, for which I was greatly indebted to General Smuts.



PART V

Chapter XXIX

THE FLORAL REGIONS OF SOUTH AFRICA

THE flora of South Africa has for a long period been of great interest to botanists, on account of certain remarkable features, for few countries show such a great diversity in their vegetation. The most interesting point, already emphasised more than once in this book, is the close relationship of the flora of one region, the Cape Region, with the flora of Australia.

There are several distinct floral regions about which a considerable amount has been published, so only a brief account of them, for the benefit of the general reader is given here.

The late Dr. H. Bolus ¹ recognised six regions as follows :—

- I. Western Coast Region.
- II. South-western Coast Region.
- III. South-eastern Coast Region.
- IV. Karoo Region.
- V. Upper Region.
- VI. Kalahari Region.

More recently Dr. I. B. Pole Evans has increased the number of regions to nineteen, and for the purposes of this book I have recognised sixteen of these, most of which I have traversed during my travels through the country. These floral regions are as follows :—

I. Cape Region (see p. 539)—Equivalent to the South-western Coast Region of Bolus, and extends inland as far as the higher plateaux. The flora of this area is quite distinct from that of other parts of South Africa, and is closely related to that of Australia, as noted above. It is probably a relic of the flora of a vast subantarctic continent, of which these two regions were a part. Characteristic families are PROTEACEAE, BRUNIACEAE and RESTIONACEAE, grasses being few and inconspicuous. Patches of forest similar to that of the Drakensberg escarpment occur here and there.

II. Little Karoo (see p. 540).—Lower than the Great Karoo, and occupies the first steppe above the Cape Region. Vegetation scanty, and composed mainly of succulents and bulbs.

III. Great Karoo (see p. 541).—A region of high elevation, composed of wide plains broken by table-topped hills and “spitzkops”, very shallow soil, and rock and stone-clad surfaces. Vegetation of low-growing and tufted xerophytic shrublets, often several species in a tuft and sheltering small succulents (*Mesembryanthemum*, *Caralluma*, etc.). Many COMPOSITAE, particularly *Pentzia*, a valuable fodder for sheep.

¹ H. Bolus, “Sketch of the Flora of South Africa” (*Official Handbook of the Cape of Good Hope*, Capetown, 1886, pp. 32).

IV. **Addo Bush** (see p. 542).—An eastern extension of the Great Karoo, with taller and dense bush, composed of large and small spiny Euphorbias and of the "Spekboom", *Portulacaria afra* Jacq. (PORTULACACEAE), etc.

V. **Namaqualand** (see p. 543).—Region of vast arid plateaux and plains, dry river-beds and bare stony or sandy surfaces. Characteristic plants are the "Kokerboom" (*Aloe dichotoma* Linn. f.), and the "Giftboom" (*Euphorbia virosa* Willd.). Small succulent species of *Mesembryanthemum* (aggreg.) mimic and hide themselves among the stones.

VI. **Namib** (see p. 544).—A littoral belt of drifting and shifting sand-dunes; vegetation extremely scanty; a striking contrast to the littoral belt of the East Coast (No. XVI); characteristic plant, *Acanthosicyos horrida* Welw. (CUCURBITACEAE).

VII. **Bushmanland** (see p. 545).—A vast flat plateau, with isolated sharp kopjes here and there, almost rainless, but the Toa grass (*Aristida brevifolia* Steud.) characteristic, with a few associated plants such as *Augea capensis* Thunb. (ZYGOPHYLLACEAE), the latter during protracted drought being sometimes the only living plant seen over large areas.

VIII. **Damaraland** (see p. 545).—A region of thorn-trees (*Acacia*) and scanty grass, sometimes park-like; a southern extension of the Angolan flora, and closely allied to the next region, the Kalahari.

IX. **Kalahari** (see p. 547).—Not a desert, as popularly supposed, but covered almost everywhere with vegetation, largely thorn trees (*Acacia*), *Grewia*, *Tarchonanthus*, *Rhus*, Olive (*Olea*), grasses, etc. (Subdivided by Pole Evans into four other regions.)

X. **Mopane Bush** (see p. 547).—Roughly a half-moon-shaped area between the Zoutpansberg and the Limpopo, covered almost entirely with the Mopane, *Copaifera Mopane* Kirk, with scattered Baobabs, *Adansonia digitata* Linn.; extends through much of Southern Rhodesia to Angola.

XI. **Low Veld** (see p. 548).—Comprises the north-eastern corner of the Union; low-level country, 400–2500 ft. alt., with perennial streams and deep soil; covered with grass, trees and bushes, giving the country a park-like appearance; characteristic tree is the "Knoppiesdoorn", *Acacia nigrescens* Oliv. (syn. *A. pallens* Rolfe), and there are many others.

XII. **Bush Veld** (see p. 549).—A region of mostly flat, low-lying country, 2500–4000 ft., with perennial streams and deep soils; thinly covered with grass and deciduous bushes and trees; thorn-trees (*Acacia*) dominate this region, and in places huge Euphorbias occur; some deciduous trees of great beauty, for example, *Terminalia sericea* Burch. (COMBRETACEAE), and the Rooibosch, *Combretum* spp.

XIII. **High Veld** (see p. 550).—Much of the Orange Free State and the southern half of the Transvaal; a region of vast, rolling tablelands and deep soils, covered with a dense, grassy turf, but with few trees or bushes; characteristic grass, "Rooi-grass", *Themeda triandra* Forssk., providing excellent grazing for all kinds of stock.

XIV. **Subalpine Region** (see p. 550).—Embraces the higher parts of the Drakensberg (Mont-aux-Sources, etc.), Basutoland and Eastern Orange Free State; characteristic plants are species of *Helichrysum*, etc.

XV. Eastern Region (Natal, etc.) (see p. 552).—A region of terraced landscapes and deep valleys with perennial streams, covered with grassy turf and scattered thorn trees in more open country, and dense, evergreen forests in sheltered kloofs; includes the southern escarpment of the Zoutpansberg and eastern escarpment of the Drakenberg. Patches of the same type of forest occur in the Cape Region. Several species of *Encephalartos* (CYCADACEAE) occur in the Eastern Region.

XVI. Eastern Coast Region (see p. 552).—A narrow, subtropical belt fringing the shore of the Eastern Region and fringing the lower levels of the rivers; heavy summer rainfall; ascends to 1000 ft., and composed mainly of dense bush and evergreen forest, forming almost impenetrable growth; some palms and mangroves.

I. Cape Region

Extends from the Oliphant's River in the west as far as Algoa Bay in the east, about 500 miles long, with an average width of about 50 miles from the coast; a very rugged, mountainous area, with a winter rainfall in its western parts and an almost equal summer and winter fall towards the east. The heaviest rainfall occurs in the Cape Peninsula, especially on Table Mountain.

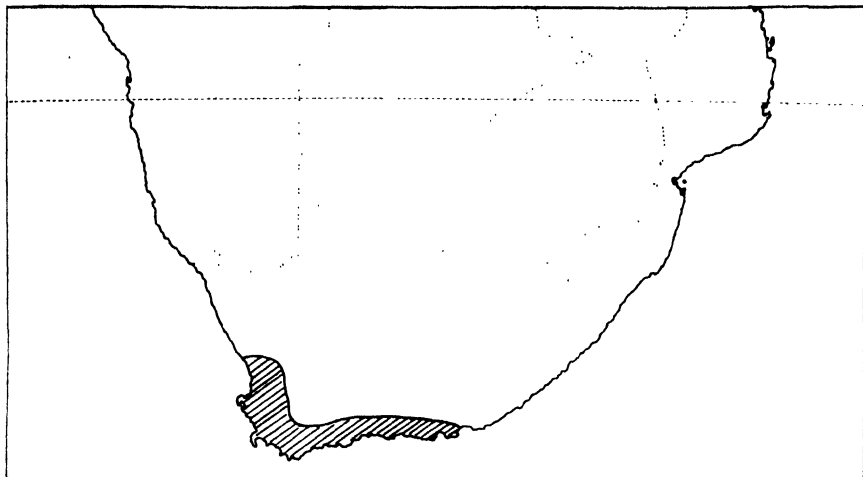
The flora of this region is related to that of Australia (see p. 21), and is quite distinct from that of other parts of South Africa, though a few outliers of it occur, the most striking being the "islands" of Cape flora on the Witteberg, in the Karoo, near Matjesfontein and on the Zwartbergen. There is also a small patch of this flora in South Natal and Pondoland, on an outcrop of Table Mountain sandstone. The most conspicuous families are the PROTEACEAE and RESTIONACEAE, both of which also occur in Australia. And there are numerous POLYGALACEAE, RUTACEAE, PAPILIONACEAE, BRUNIACEAE and COMPOSITAE, whilst *Erica* finds its headquarters here, there being as many as 100 species on the Cape Peninsula.

Small patches of forest are found in most of the deep mountain ravines facing the sea, and there are dense, extensive forests from George eastwards to Humansdorp. The trees in these forests nearly all occur in the Eastern Region, along the escarpment of the Drakensberg. Chief among them are the Stinkwood, *Ocotea bullata* E. Mey. (LAURACEAE), and the Yellow-woods, *Podocarpus* spp. (TAXACEAE), whilst beautiful flowering trees are *Virgilia capensis* (Linn.) Lam. (PAPILIONACEAE) and *Sparrmania africana* Linn. (TILIACEAE). A list of the principal trees and shrubs of these forests is given on p. 224.

Small "cedar" forests, *Widdringtonia juniperoides* Endl. (CUPRESSACEAE), occur in the Cedarbergen, in the Clanwilliam Division.

On the mountain slopes of the Cape Peninsula are small patches of the beautiful "Silver tree", *Leucadendron argenteum* Linn. (see p. 23).

The dominant bush throughout the region, and largely due to overstocking, is the Rhenoster Bush, *Elytropappus rhinocerotis* (Linn.) Less. Grasses are few, their place being taken by the RESTIONACEAE. Typical plants in vleis are the "Palmiet", *Prionium serratum* (Linn. f.) Drège (CYPERACEAE), and Arum lily, *Zantedeschia aethiopica* (Linn.) Spreng. (ARACEAE).

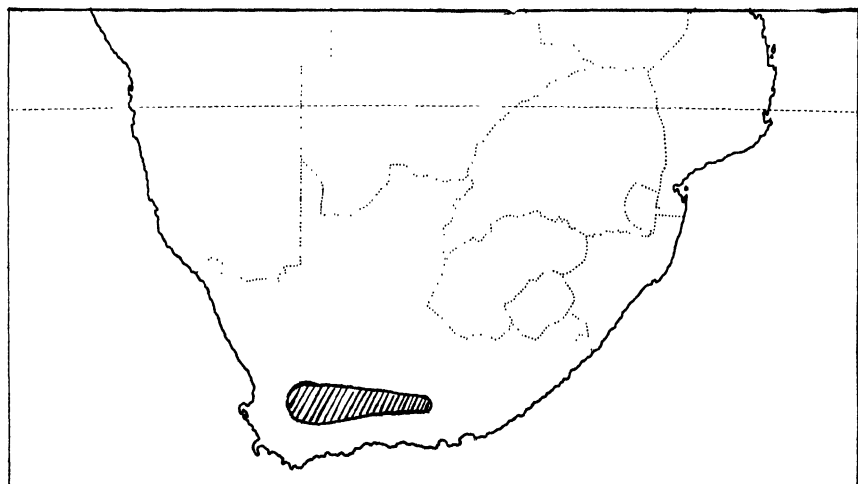


Approximate area of the CAPE floral region.

On the sand dunes of the Cape Peninsula and other parts of the coast common shrubs and shrublets are *Myrica cordifolia* Linn. (MYRICACEAE), *Passerina ericoides* Linn. (THYMELAEACEAE) and *Mundtia spinosa* DC. (POLYGALACEAE). Other very common plants are *Eriocephalus umbellulatus* DC. and *Metalsia muricata* (Linn.) Less.

II. Little Karoo

This is a comparatively small area, and very arid, between the Cape region and the Great Karoo. It extends from the north-east portion of Ceres through part of Worcester (north-east of the Hex River Pass), Laingsburg (south-west portion), Robertson (Montagu district), Ladi-



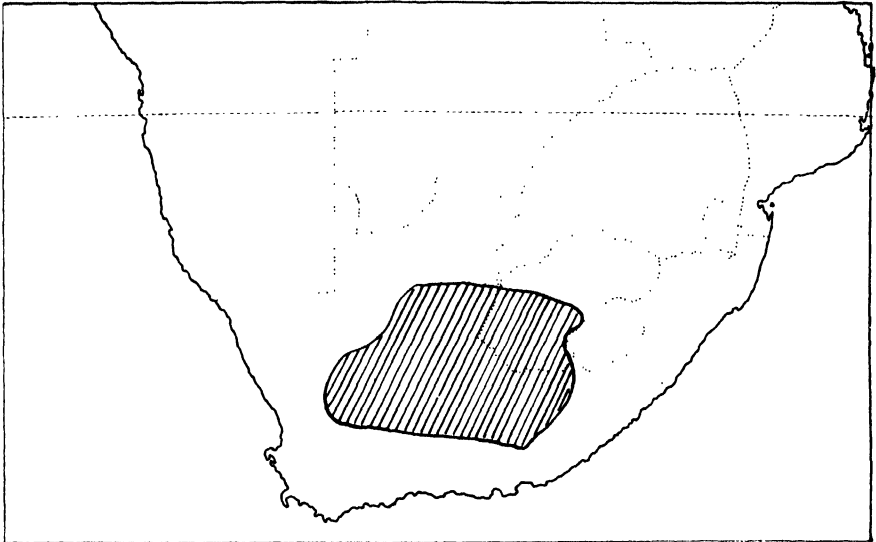
Approximate area of the LITTLE KAROO floral region.

smith, Oudtshoorn, and the northern parts of Riversdale, George, Uniondale and Humansdorp.

Characteristic plants of this region are *Aloe ferox*, *Cotyledon paniculata* and *C. Wallichii*.

III. Great Karoo

A vast inland, shallow basin ranging from about 2000 to 5000 ft., traversed by numerous river-beds, which are quite dry for most of the year. These dry river-beds shelter the only trees—mostly thorn Acacias (*Acacia horrida*)—to be found in the Karoo. The remainder of the vegetation is composed of xerophytic shrublets, tuberous and bulbous plants and succulents. The family most highly represented is



Approximate area of the GREAT KAROO floral region.

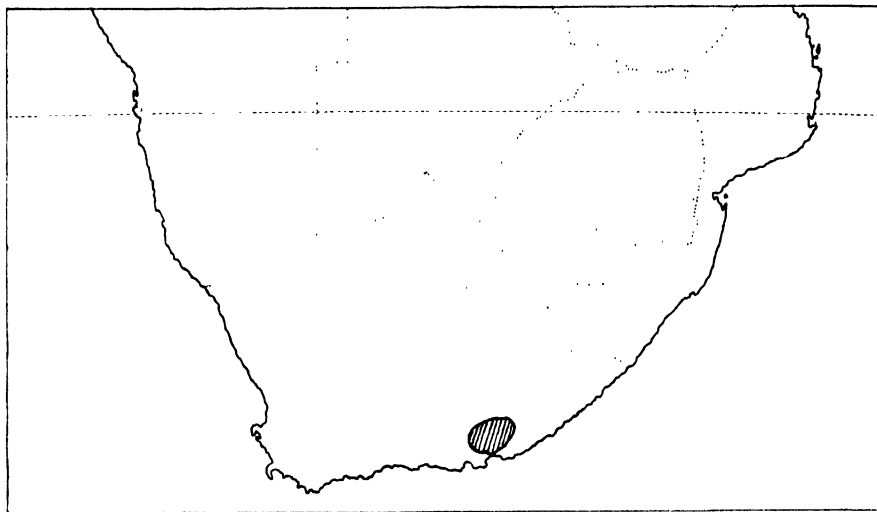
COMPOSITAE, among which the genus *Pentzia* is of great economic importance, being a valuable fodder for stock. *Mesembryanthemum* and allied genera (FICOIDACEAE) are represented by very numerous species; also *Crassula* (CRASSULACEAE), *Pelargonium* (GERANIACEAE), and *Pteronia* (COMPOSITAE), etc. The *Pentzias* and *Galenia africana* Linn. (FICOIDACEAE) are often dominant over large areas, and wherever the soil is brackish, the Gannabosch, *Salsola* spp., grows in great profusion.

The Karoo is a country of shallow soils and rock-strewn surfaces with a low average rainfall (up to 15 ins.), with high day- and low night-temperatures. Grass is almost entirely absent. Shrublets belonging to two or three different genera often grow in little clumps, and frequently shelter at their base a succulent plant. Many small fleshy species of *Mesembryanthemum* and allied genera mimic the stones among which they grow and are difficult to detect.

IV. Addo Bush

The Addo Bush occupies a comparatively small region centring round the village of Addo from which it takes its name. A characteristic plant of this formation is the "Spekboom", *Portulacaria afra*, interspersed with succulent species of *Euphorbia* and other fleshy plants and species of *Asparagus*. On the occasion of my visit the "Spekboom" in certain places was a mass of pink flowers, a beautiful sight in contrast with the dull sombre green of the surrounding vegetation. The "Spekboom" is an important food-plant for elephants and other animals.

In valleys and steep places in the Addo Bush the vegetation is considerably higher than on the flatter, exposed areas; tree *Euphorbias* are very conspicuous, and associated with them are species of *Rhus*,



Approximate area of the ADDO BUSH floral region.

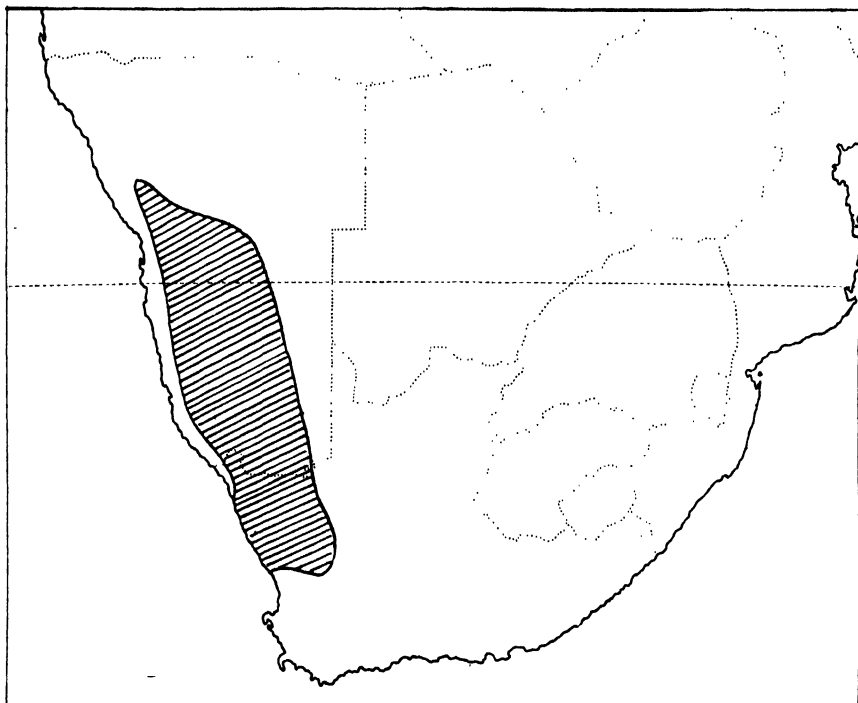
Grewia, *Schotia*, *Olea*, *Lycium*, *Acacia horrida*, *Carissa Arduina*, *Pavetta lanceolata*, and *Rhigozum obovatum*. In shady places are species of *Pelargonium* and *Mesembryanthemum*, whilst climbing over the thorn scrub are *Clematis brachiata*, *Tecomaria capensis* and *Plumbago capensis*. On dry rocky hills, and especially in the neighbourhood of Hankey, I have seen numerous and very large examples of the "Elephants-foot", *Testudinaria elephantipes*, the woody stock of some of them being as much as 4 ft. high. The fibrous plant, *Sansevieria thyrsiflora*, is common everywhere, whilst there are Cycads (*Encephalartos*) here and there. In favourable seasons in the early spring (September) small areas between the fleshy scrub plants are densely covered with sheets of blue *Morea*.

The flora of the Addo Bush is in the highest degree xerophytic, but I cannot support Engler's view as to its great antiquity. Apart from the Cycads, which are comparatively rare and probably relicts of the former and even more desert flora, the plants one meets with in the

Addo bush belong to families which are phylogenetically the most recent and at the same time best adapted to the arid conditions under which they grow. In my opinion the Addo Bush, as we find it today, is one of the most recently evolved of the South African floral regions, and its flora may be regarded as more highly evolved than that of the Karoo.

V. Namaqualand

Namaqualand is a region of vast stony plains, kopjes, and flat-topped mountains, interspersed here and there with dried-up river valleys. The rainfall is under 10 ins., and falls during winter.



Approximate area of the NAMAQUALAND floral region.

The flora is strongly xerophytic, and a characteristic plant is the Kokerboom, a giant *Aloe*, *A. dichotoma* Linn. f., occurring on rocky slopes, and much resembling in habit the Dragon Tree of the Canary Islands (*Dracaena Draco* Linn.). Other typical plants are the Giftboom, *Euphorbia virosa* Willd., and another plant of peculiar habit, *Pachypodium namaquanum* Welw. (APOCYNACEAE).

Along the dry river-beds and valleys in the interior the vegetation is composed mainly of the Camel Thorn, *Acacia Giraffae* Burch., the Sweet Thorn, *A. Karroo* Burch., the Haakdoorn, *A. detinens* Burch., Black Ebony, *Euclea pseudebenus* E. Mey., and species of *Zygophyllum*, etc.

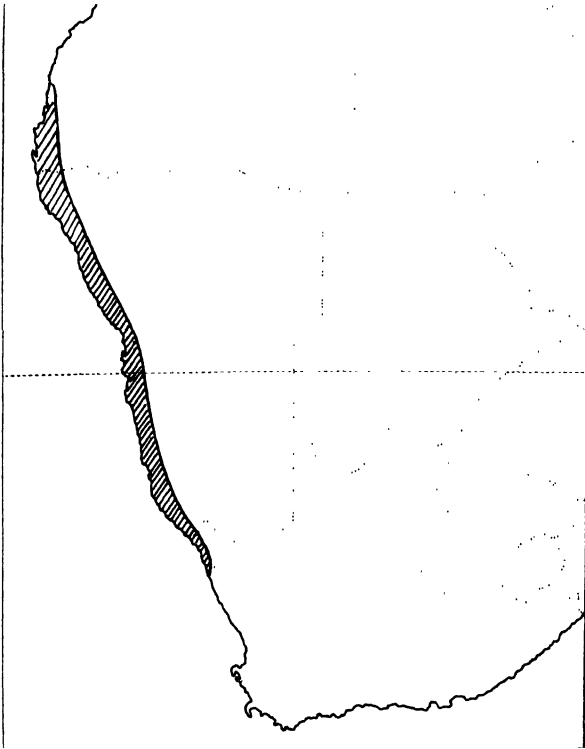
Large flat tracts are often dominated by one particular species, such

as the Aggennys Euphorbia, *E. gregaria* Marloth, and the Driedoorn, *Rhigozum trichotomum*.

After good rains, which occur during some seasons, much of the country, like the Karoo, becomes a vast flower-garden of beautiful annuals, one of the most striking being *Venidium fastuosum*, besides lovely sheets of *Ursinia*, *Arctotis*, and dwarf species of *Aster*.

VI. Namib

The Namib is an almost waterless tract occupying a narrow coastal strip, and extending from a little south of the Orange River to the



Approximate area of the NAMIB floral region.

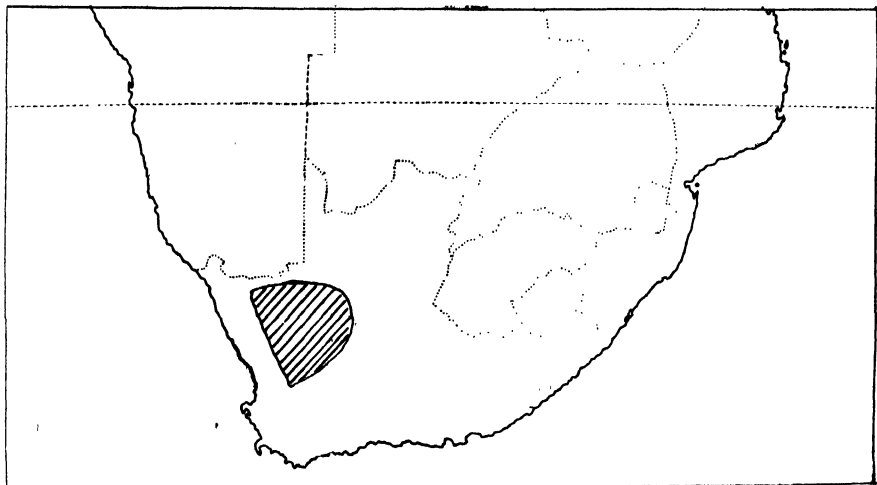
southern part of Angola, "pinching out" to the north about 14° south latitude. This and Damaraland are the only floral regions in South Africa which I have not seen personally. The short accounts of these have therefore been compiled from the information at present available,¹ which, however, is still very scanty. It is a region of drifting and shifting sand-dunes and of gravel plains, and is the nearest approach to a desert in the whole of South Africa, not excluding the so-called Kalahari "Desert", which is a misnomer. The reader may gain some idea of this terrible country in *Skeleton Coast*, by J. H. Marsh (Hodder & Stoughton, 1945).

¹ See Pole Evans, "The Vegetation of South Africa," in *South Africa and Science*, pp. 193-4 (1929).

The sand-dunes carry a very scanty vegetation, composed mostly of *Eragrostis spinosa* and *E. cyperoides*, whilst the sea-shore harbours species of *Salicornia* and *Salsola*, *Acanthosicyos horrida* Welw., with melon-shaped fruits, and *Tamarix articulata*.

The most remarkable plant of this region is *Welwitschia Bainesii*, a monotypic family with no near relatives, but formerly included in the *Gnetaceae*.

Other typical plants of the Namib are *Statice scabra* Thunb., *Dicoma tomentosa* Cass, *Eremothamnus Marlothianus* O. Hoffm., and *Mesembryanthemum Marlothii*, the last mentioned, according to Marloth, being one of the dominant and most specific plants of this region.



Approximate area of the **BUSHMANLAND** floral region.

VII. Bushmanland

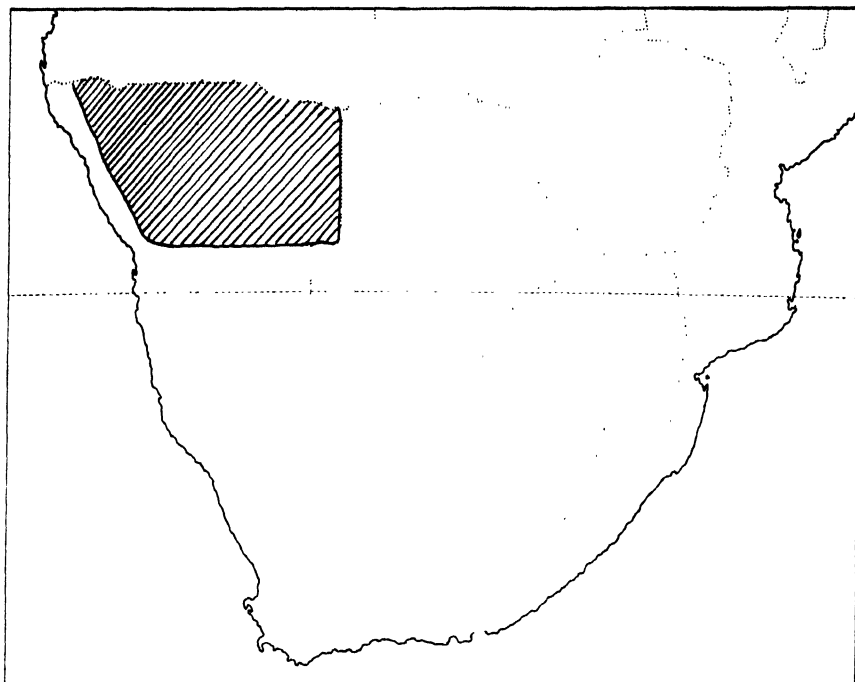
A vast arid flat plateau, with an annual rainfall of less than 5 ins., bounded on the west by the highlands of Namaqualand (Khamicsberg, etc.), on the north by the valley of the Orange River, on the east by the Kaap Plateau (Kalahari Region), and on the south by the Great Karoo. It is a country of sandy plains and sand-dunes, undulating and featureless, and with striking mirages; average altitude 2000–3500 ft.

The most prominent plants of a scant vegetation on the plains are the "Toa grass", *Aristida brevifolia*, *Augea capensis* (ZYGOPHYLLACEAE), *Sarcocaulon Burmannii* (GERANIACEAE), and *Hoodia Gordonii* (ASCLEPIADACEAE), *Salsola* spp., and on the rocky outcrops the "Kokerboom", *Aloe dichotoma*.

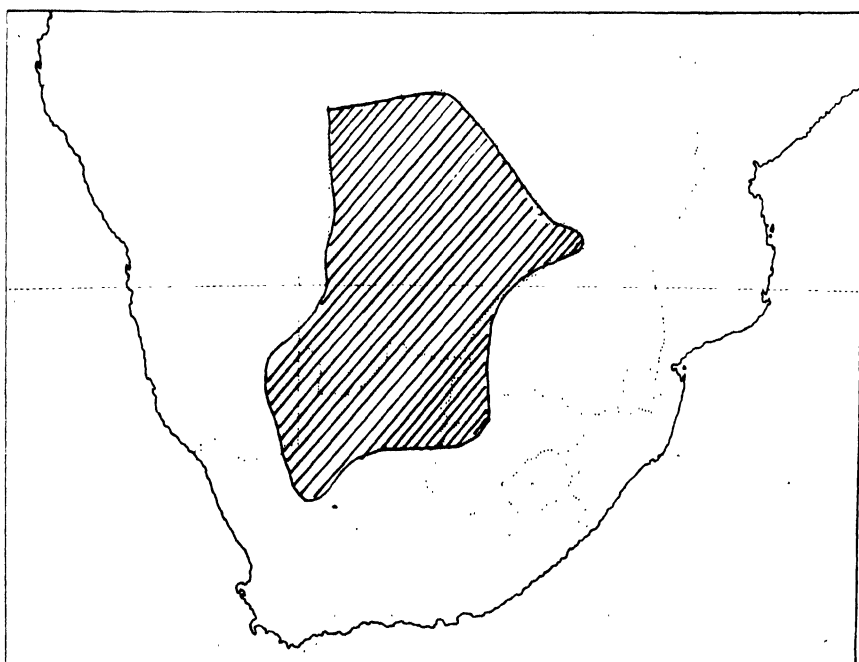
This is apparently a primitively desert area which has been only partly invaded by the Namaqualand flora.

VIII. Damaraland

This is an extension of the great Angolan flora to the north and closely allied to the next region, the Kalahari; a region of thorn-trees (*Acacia*) and grass, sometimes park-like (savannah), with more and



Approximate area of the DAMARALAND floral region.



Approximate area of the KALAHARI floral region.

taller grasses. Species of *Boscia* (CAPPARIDACEAE) are common, and succulents are species of *Aloe* and *Senecio*.

In the dry river-valleys the trees are larger and consist chiefly of *Acacia Giraffae*, *A. karroo*, and *Zizyphus mucronata*.

IX. Kalahari

This is not a desert, as so named, but covered almost everywhere with vegetation; the most extensive of the botanical regions of South Africa, and gradually merging into the surrounding regions. Divided by Pole Evans into four as follows:—

A. *The Griqualand West Thorn Veld*.—The veld is park-like throughout, with various thorn trees (*Acacia* spp.), growing among grass, and other trees and bushes, including *Boscia*, *Tarchonanthus*, *Rhus*, *Grewia*, etc., with succulents, *Aloe* spp.

B. *Kaap Plateau*.—A limestone plain from south of Griquatown to north of Vryburg; a very flat area, with numerous pans. This plateau is covered by bush or scrub up to 15 ft. high, composed mainly of *Tarchonanthus*, *Rhus*, *Acacia*, and scattered Olives (*Olea verrucosa*), with shrublets of *Pentzia* and *Chrysocoma* (COMPOSITAE). The blue "tulp" (*Morea polystachya* (IRIDACEAE)) and *Urginea Burkei* (LILIA-CEAE) are extremely common.

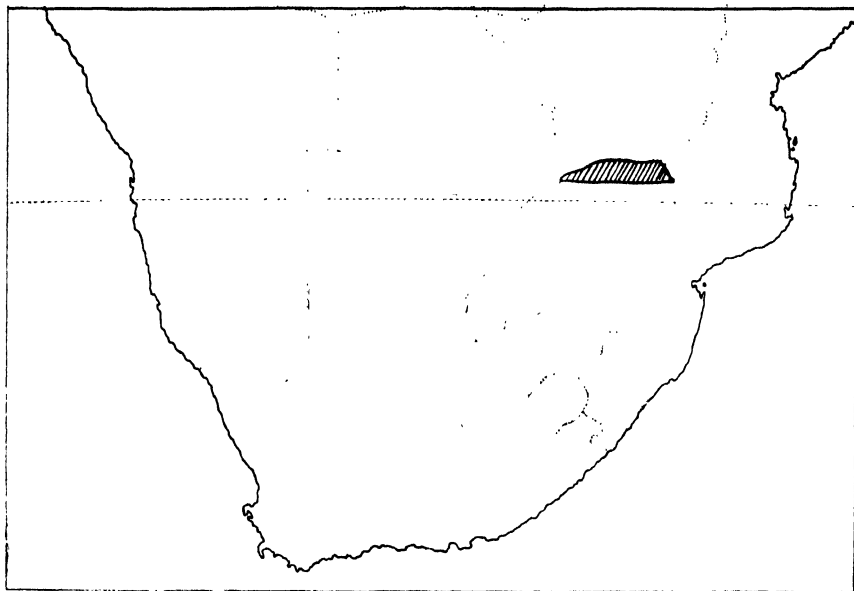
C. *Vaal Kameel Veld of the Asbestos Mountains*.—With many of the same species as on the Kaap Plateau.

D. *Kalahari Sand Veld*.—Includes Gordonian, Kuruman and Vryburg districts and Bechuanaland, stretching north as far as the Zambesi; covered with deep sand, often thrown up into long dunes lying in a west-north-west direction; most of these dunes are covered with coarse grasses, with scattered trees of *Boscia* (CAPPARIDACEAE), and the brak-pans between with *Atriplex*, *Salsola*, *Erioccephalus* and *Euryops*.

A characteristic plant of certain parts of the sand-veld is the "Tsamma" (*Citrullus vulgaris*), a melon providing a valuable stock food in times of drought.

X. Mopane Bush

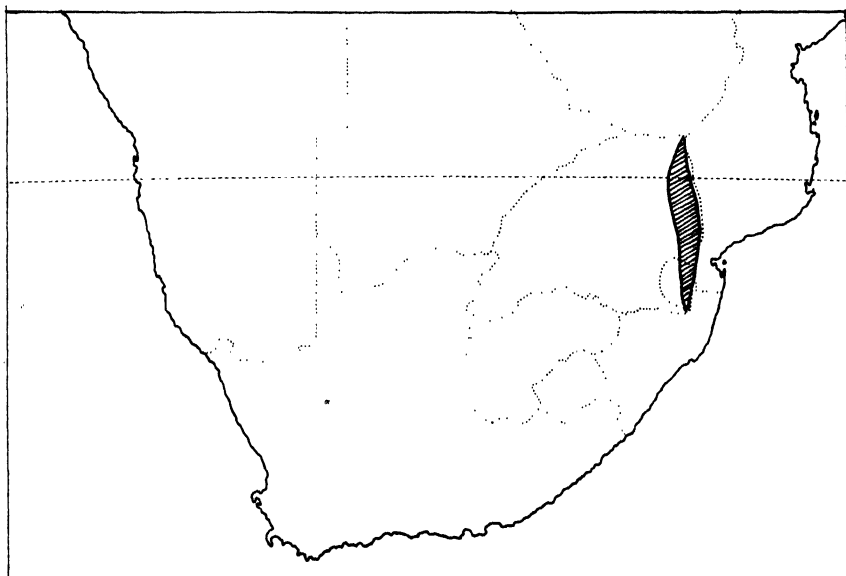
An almost flat region of low elevation, between the Zoutpansberg Range and the Limpopo River, in the Northern Transvaal, nearly everywhere covered with "Mopane", *Copaifera Mopane*, a peculiar resiniferous, leguminous tree with butterfly-like leaves. Dotted here and there are Baobab trees, *Adansonia digitata* (BOMBACACEAE), sometimes of great girth (often 100 ft. or more in circumference). The Baobab is also scattered throughout the Savannah regions of Tropical Africa, but probably nowhere is it so numerous as in this region, especially on the lower northern slopes of the Zoutpansberg, which forms a barrier in the south, and beyond which it scarcely penetrates. The remainder of the vegetation in this area is mainly thorn-scrub and scattered herbs (MALVACEAE, ACANTHACEAE, etc.). Large trees (*Ficus*, *Acacia*, etc.) occur along the banks of the Limpopo and its tributaries. This is a hot, dry region with little rainfall.



Approximate area of the MOPANE BUSH floral region.

XI. Low Veld

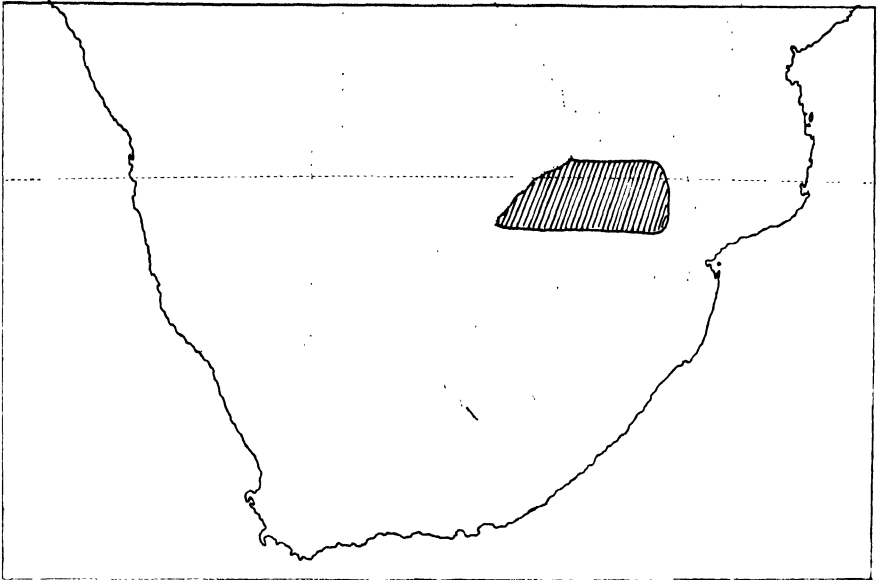
This occupies the country in the north-east corner of the union; consists mainly of hot, flat, low-lying country 400–2000 ft. above sea-level; well supplied with perennial rivers. Apart from the low



Approximate area of the Low VELD floral region.

Lebombo Range of hills, the country is flat, with massive boulders of granite, with a rainfall up to 70 ins. The country is park-like, with scattered fairly large trees and a dense growth of grass, undershrubs and herbs, with a luxuriant vegetation along the river valleys.

A common tree is the "Knoppiesdoorn", *Acacia nigrescens*, and other typical trees are *Sclerocarya caffra* (ANACARDIACEAE), *Excoecaria africana* (EUPHORBIACEAE), *Diospyros mespiliformis* (EBENACEAE), *Syzygium cordatum* (MYRTACEAE), *Peltophorum africanum* (CAESALPINIACEAE), *Lonchocarpus* (PAPILIONACEAE), *Androstachys Johnsonii*



Approximate area of the BUSH VELD floral region.

Prain (EUPHORBIACEAE) and the Sausage-tree, *Kigelia pinnata* (BIGNONIACEAE). This region is regarded as the most fertile tract of country in South Africa, but is not particularly healthy for Europeans.

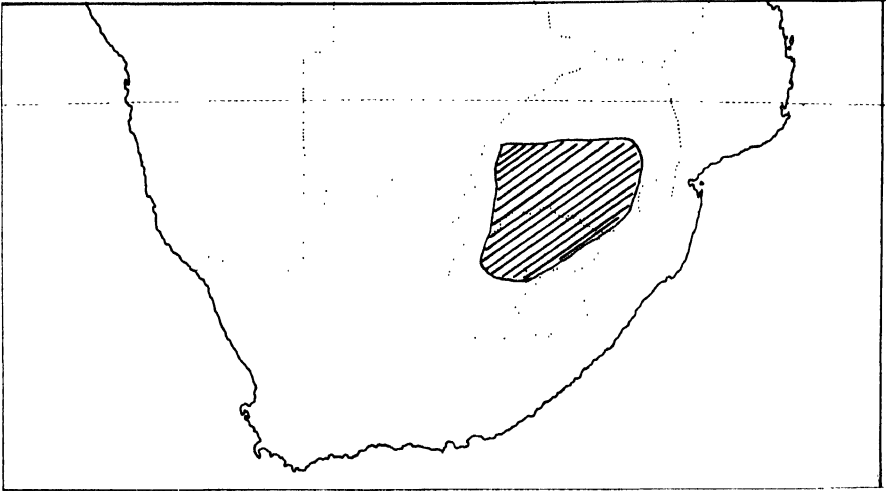
XII. Bush Veld

This occurs at a higher elevation (2500–4000 ft.) than the Low Veld, and occupies a narrow strip of country through the middle of the Transvaal, about 300 miles from east to west and 80 miles from north to south. The rainfall varies from 20 to 30 ins., and the soils are mostly deep and sandy, with large areas here and there of "black turf" soil, which supports only grass and thorn-bush, whereas grass, trees and bush cover the sandy soil.

Thorn-trees (*Acacia* spp.) dominate the Bush Veld throughout, with *Dichrostachys* (MIMOSACEAE) and *Peltophorum* (CAESALPINIACEAE); striking trees are *Burkea africana* (CAESALPINIACEAE), *Faurea saligna* (PROTEACEAE), *Terminalia sericea* and *Combretum* spp. (COMBRETACEAE), *Zizyphus mucronata* (RHAMNACEAE), etc.

Succulents in this area are striking features of the landscape, *Euphorbia ingens* and *E. Cooperi* (EUPHORBIACEAE), *Aloe Marlothii*, etc., and there are numerous grasses and other herbs, including even the Rooi grass of the High Veld (*Themeda triandra*).

A formation intermediate between the Bush and High Veld is distinguished by Pole-Evans as "Banken Veld", a broken, hilly country consisting mainly of grass-covered slopes on which stunted, deciduous trees and sclerophyllous bush occur on rocky outcrops or "banken" (Dutch). It embraces the Magaliesberg and the Waterberg of the Transvaal.



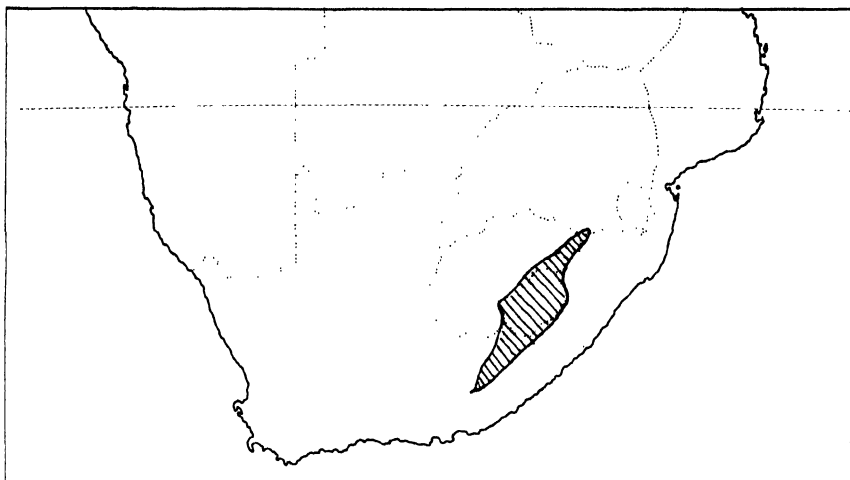
Approximate area of the HIGH VELD floral region.

XIII. High Veld

An almost treeless area occupying the southern half of the Transvaal and much of the Orange Free State (part of it is distinguished by Pole Evans as "Middle Veld"); gradually merges into the subalpine region of Basutoland, etc.; alt. 4000–5000 ft., sloping gently to the west. Surfaces are covered with grasses, the dominant being the Rooi Grass, *Themeda triandra*. Trees grow only along the rivers, including *Acacia karroo*, a willow, *Salix capensis*, and *Combretum erythrophyllum* (COMBRETACEAE). The High Veld affords excellent grazing and pasturage for stock; there are several poisonous plants, such as *Pachystigma pygmaea* (RUBIACEAE). Overstocking results in the veld being over-run with *Stoebe cinerea* (COMPOSITAE), which crowds out the grasses.

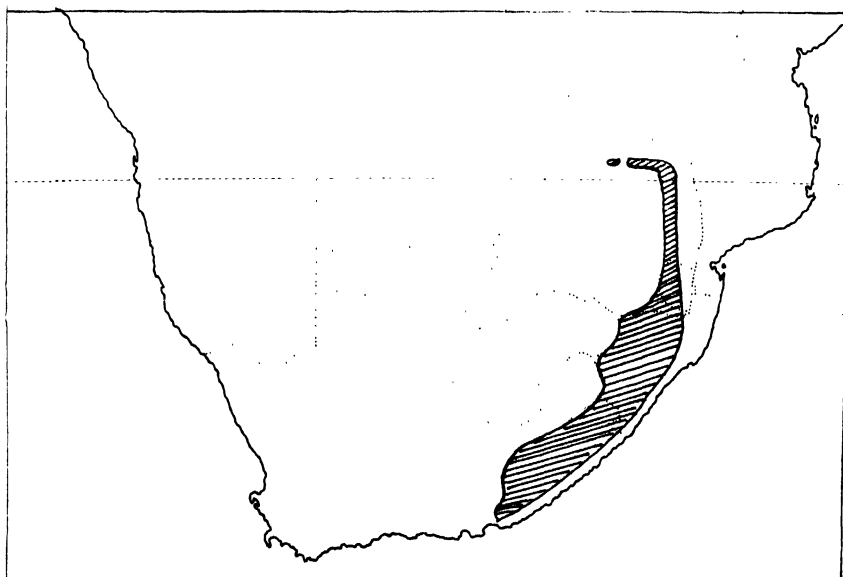
XIV. Subalpine Region

This embraces the higher parts of the Drakensberg, the whole of Basutoland, the higher eastern parts of the Orange Free State, and the high mountains of the Eastern Cape Province. It is covered with short grass and other herbs, including *Helichrysum* spp. (COMPOSITAE), and with a considerable proportion of genera from more temperate regions,



Approximate area of the SUBALPINE floral region.

such as *Clematis*, *Thalictrum*, *Anemone*, *Ranunculus*, *Corydalis*, various CRUCIFERAE, CORYOPHYLLACEAE, etc., most of them being found throughout the high mountain region from Table Mountain through the mountains of south-east and east tropical Africa right into the temperate regions of the Northern Hemisphere. It is through this region that considerable migration has occurred, portions of the Cape flora, such as PROTEACEAE, ERICACEAE and *Pelargonium* have spread northwards to the Mediterranean, etc., whilst boreal types have migrated southwards, such as *Anemone*, *Clematis*, *Coryophyllaceae*, etc.

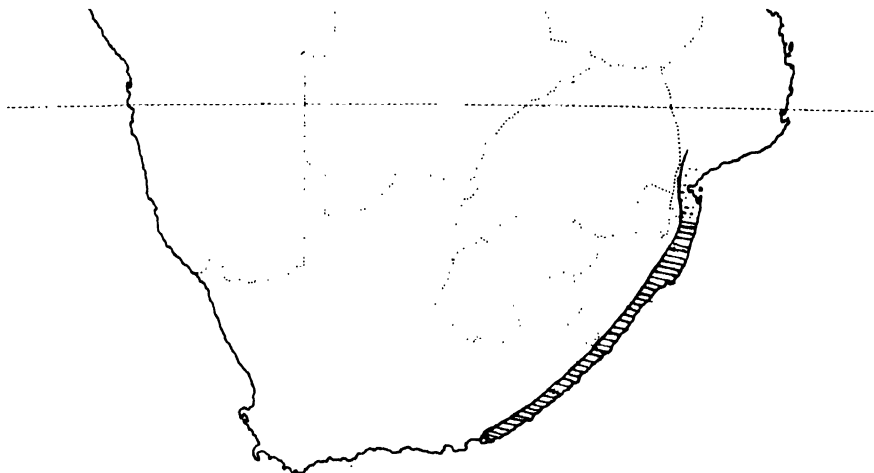


Approximate area of the EASTERN floral region.

XV. Eastern Region

Except for a narrow coastal strip, this embraces the whole of South-east Africa from Algoa Bay to Portuguese East Africa, and westward as far as and including the eastern escarpment of the Drakensberg and the southern slopes of the Zoutpansberg. At the southern end there is a gradual infiltration of Cape and Karoo forms, such as *Portulacaria* and large *Euphorbias*, and in the north the flora gradually merges into that of East Tropical Africa.

Pole Evans subdivides this region into two:—I, The Thorn or Sweet Veld, and II, the Berg or Sour Veld (part of the latter being included here in the Subalpine Region).



Approximate area of the EASTERN COAST floral region.

In the Thorn Veld there is an abundance of the sweet-thorn, *Acacia karroo*, and other species, *Dichrostachys*, *Celastrus*, *Zizyphus*, *Erythrina*, *Cussonia* and *Sclerocarya*, the grasses being *Eragrostis plana*, *Sporobolus indicus*, *Themeda triandra*, and species of *Andropogon*.

In the Berg Veld there are scattered *Proteas*, with yellow-wood (*Podocarpus*) forests in the sheltered kloofs. A conspicuous plant association is *Leucosidea sericea*, an endemic Rosaceous shrub which occurs throughout the Drakensberg.

The Eastern Region contains the largest and most important forests in the Union; these are found on the Kaga Berg, the Great Winterberg, and the Amatola Mountains, in the Transkei, Pondoland, and on the higher slopes of the Drakensberg in Natal and the Eastern Transvaal. They are *mixed* forests, but the yellow-woods (*Podocarpus* spp.) predominate. Many of the species composing these forests occur also in the patches of forest in the Cape Region farther south, and also on the southern slopes of the Zoutpansberg to the north.

XVI. Eastern Coast Region

Fringing the shore of the last region, and ascending the river valleys to about 800 ft., from East London to Portuguese East Africa, is

a narrow coastal belt of luxuriant vegetation, tropical in character. The rainfall is heavy, and the temperature uniform. The vegetation is composed of dense bush and evergreen forest patches, averaging 10–30 ft. high. The trees are of tropical African affinity.

Wherever lagoons occur there are mangroves of *Avicennia* (VERBENACEAE), *Rhizophora* and *Bruguiera* (RHIZOPHORACEAE), with *Hibiscus tiliaceus* Linn. (Malvaceae) on the edge of the river estuaries, and *Barringtonia racemosa* Roxb. (LECYTHIDACEAE).

In the forests of this area occur a wild Box, *Buxus MacOwani* Oliv., and the Cape Mahogany, *Trichilia emetica* Vahl; and there are other fine trees, but many are fast disappearing owing to the cultivation of sugar cane.

Palms are conspicuous and are *Phoenix reclinata* Jacq., *Hyphaene crinita* Gaertn. and *Jubaeopsis caffra* Becc.

Even in so moist an area some succulents occur, such as *Euphorbia grandidens* Harv. and *E. tetragona* Harv. (EUPHORBIACEAE), *Aloe africana* Mill. (LILIACEAE), etc.

This narrow belt may be regarded as almost entirely of tropical African origin, being an extension of the flora of the East African coast belt.

Chapter XXX

REVIEW OF SOUTH AFRICAN BOTANICAL LITERATURE WITH SPECIAL REFERENCE TO THE TAXONOMY OF FLOWERING PLANTS

THE following notes on the literature of South African botany, with particular reference to the taxonomy of flowering plants, have been compiled for the benefit of beginners and new students of the South African flora. They are based on the alphabetical list given by Macowan & Bolus¹ in 1882, and the botanical journals since that date have been searched. Only the principal papers have been included, but not those mainly devoted to the description of new species, many of which have found a place in the *Journal of Botany* and the *Gardeners' Chronicle* in England, by the late Dr. N. E. Brown and S. Moore, and in *South African Gardening and Country Life*, in South Africa, where Dr. L. Bolus and others have published a great number; in Engler's *Botanische Jahrbucher*, *Bulletin de l'Herbier Boissier*, etc. If any important papers have been omitted it has not been intentional, and the author trusts they will be very few.

To many of the earlier works it has seemed useful to append a few explanatory notes for the sake of the student. It will be noted that the first mentioned was published in 1644, so that there is not a great deal of pre-Linnaean (1753) literature, and very little of it was devoted entirely to African botany. Perhaps worthy of particular notice is that of Peter Kolbe's *Beschreibung des Vorgebirgs der guten Hoffnung und der Hottentotten*, published in 1719, many of the plants mentioned having already *binomials*, some thirty-four years before its general introduction by Linnaeus in 1753.

Another striking work is Jan Burman's *Decades Plantarum Africanarum* (1738-9), which contains 100 excellent pictures of South African plants.

The first *Flora Capensis*, by Linnaeus, is specially noted (p. 562), and facsimilies of the title-page and a sample page given. Attention is also drawn to the fine figures of plants in N. J. Jacquin's *Icones Plantarum Rariorum* (1781-93), and to the precedence of some of Bergius' names over those in Linnaeus' *Mantissa prima* (p. 567).

The establishment of Curtis' *Botanical Magazine* in 1787 provided a medium for the display of many of South Africa's beautiful plants, which were much cultivated about that time, especially by Aiton at Kew.

The importance of Thunberg's work for South Africa cannot be over-emphasised, and the first of his numerous works appeared in 1794 (p. 570), whilst the work of the first Kew gardener to visit the Cape, Francis Masson, is noted.

Andrews' *Botanists' Repository* became another medium for coloured

¹ Macowan and Bolus, *Trans. Philosoph. Soc. S. Afr.*, 2 : 101-87 (1882).

illustrations in 1797, and his *Heaths* (1802–30) and *Monograph of Geraniums* (1805) showed the beauties of *Erica* and *Pelargonium* respectively.

And so the story of South African botanical literature is traced past the appearance of Schultes' edition of Thunberg's *Flora Capensis* in 1823, the *Compositae* of Lessing (1832), Meyer's account of Drège's plants (1835–37), Harvey's classical *Genera of South African Plants* (1838), Nees' work on the *Gramineae* (1841), Harvey's *Thesaurus Capensis* (1859–63), until the great *Flora Capensis* of Harvey and Sonder, which was begun in 1859. It is to the credit of Sir J. D. Hooker that this very important work was continued at Kew after the early death of Harvey, and particularly to Sir W. T. Thiselton-Dyer, who became its editor and saw its completion. The story of this great undertaking at Kew is given in some detail later on.

Thereafter titles of papers mainly speak for themselves, though some authors deserve very special mention because of their outstanding contributions. Chief among them were J. G. Baker (Monocotyledons), F. Guthrie and H. Bolus (*ERICACEAE*, etc.), O. Stapf (*GRAMINEAE*), J. Medley Wood (Natal Flora), T. R. Sim (various), R. Marloth (Flora of S. Africa), N. E. Brown (*ASCLEPIADACEAE*, *Mesembryanthemum*, etc.), L. Bolus (general), E. P. Phillips (*Genera of South African Plants*, etc.), J. Burt-Davy (*Flora of the Transvaal and Swaziland*, etc.), N. S. Pillans (*RESTIACEAE* and *Phyllica*), whilst in very recent years the taxonomic works of H. Weimareck, R. H. Compton and M. R. Levyns have been outstanding, besides the ecological studies of J. W. Bews, R. S. Adamson and J. F. V. Phillips.

Very worthy names which should also be mentioned are those of General Smuts, for his great interest in and encouragement of Botanical Science in South Africa, and of Dr. I. B. Pole Evans for his able administrative work as Chief of the Division of Plant Industry.

Theophrastus, 1644.—The earliest known collector of South African plants was Heurnius,¹ and there are four figures of Cape plants collected by him in Theophrastus, *Historia Plantarum*, published at Amsterdam in 1644. These are named as follows, and I append to each their modern equivalents:—

“*Tulipa capensis, sive promontorii bonae spei*” (*Haemanthus coccineus* Jacq.).

“*Sedum arborescens promontorii bonae spei*” (*Cotyledon orbiculata* Linn.).

“*Fritillaria crassa promontorii bonae spei*” (*Ceropegia variegata* L.).

“*Iris uvaria*” (*Kniphofia alooides* Moench.).

Here is a transcription of the text relating to the *Haemanthus*, as it may be of interest to the general reader to see a copy of the first description of a Cape plant:—

“*Tulipa Capensis, sive promontorii bonae spei; bulbum pugno majorem habet, ex squamis crassis confectum, qui nauseabundum odorem emittit. Ante folia flos e bulbo Aprili mense erumpit, qui phoeniceo coloris visui gratus est; fere quinis constants foliis oblongis, latiusculis, crassis, & in*

¹ The proper spelling of the name should be noted, because R. Brown misspelled it in founding the genus “*Huernia*”, which should have read *Heurnia*. According to International Rules the latter should be the spelling.

summo orbiculatis. Floris cavitas staminibus ex rubro albicantibus repletur; quibus insident appendicula crocea; flos cauli spithanum longo, rotundo institit, qui fundi albi maculis guttisque purpureis variegatus est. Nascitur locis montanis. Folia lata crassaue habet. Flore defluente, semina in umbella habet, multis acinis purpureis, quae grana duo vel tria singula continent, ex staminibus eminentibus."

Breynius, 1678.—J. B. Breynie, *Jacobi Breynii Gedanensis Exoticarum aliarumque minus cognitarum Plantarum, centuria prima*, etc.—In 1678



Breynius' first plate, *Brabeium stellatifolium* Linn. (PROTEACEAE), published in 1678.

Jacob Breynie (latinised Breynius), a merchant of Danzig, published a fine volume of descriptions and figures of exotic plants, among which were as many as forty-eight Cape species. The first shown is *Brabeium stellatifolium* Linn., and it bears the lengthy name of "*Amygdalus aethiopica fructu holoserico*", after the fashion of nomenclature in those days. These handsome plates were identified by E. F. Klinsmann of Danzig in 1855, in a work entitled *Clavis Breyniana*. Among

other plants depicted in this classical work of Breynius are the now well-known *Myrsine africana* Willd. (t. 5), *Phylica brunioides* Lam. (t. 7), *Leucadendron decurrens* R. Br. (t. 9), *Brunia nodiflora* Willd. (t. 10), *Erica cerinthoides* Willd. (t. 13), *Psoralea aphylla* Willd. (t. 25), *Aspalathus spinosa* Willd. (t. 26), *Borbonia ruscifolia* Dietr. (t. 28), *Sutherlandia frutescens* R. Br. (t. 29), *Wachendorfia hirsuta* Willd. (t. 37), *Pelargonium triste* Willd. (t. 58), *Othonna bulbosa* Willd. (t. 66), *Cenia turbinata* Comm. (t. 73), *Osteospermum moniliforme* Willd. (t. 76). I give here a reproduction of Breynius' first plate, that of a fruiting example of *Brabeium stellatifolium* Linn., which bears the signature of the engraver, Isaac Saal. It will be seen that these drawings are of a very high standard and may still be ranked as some of the very best figures of South African plants.

Morison, 1680.—Robert Morison's *Plantarum historiae universalis Oxoniensis* (1680) contains several illustrations of Cape plants, and they are very good pictures. Morison was of Scottish nationality, and was born at Aberdeen in 1620. He entered Aberdeen University to be trained for the Church, but eventually turned his attention to mathematics, and subsequently to medicine and botany. He graduated as Doctor of Philosophy at the age of eighteen!

On leaving college, Morison fought in the Civil War on the side of the Royalists, and when their cause was lost he proceeded to Paris, where he took up botany under Robin, botanist to the King of France. The Duke of Orleans appointed him steward of his garden at Blois (1650–1660). Whilst there he explored several French provinces and brought under cultivation many of his discoveries.

On the restoration of Charles II, Morison returned to England, and was made Physician to the King. Later he was appointed Professor of Botany at Oxford, and wrote the remarkable work mentioned above. Previous to its publication he issued, in 1672, a celebrated work on the UMBELLIFERAE, entitled *Plantarum Umbelliferarum Distributio Nova, per tabulas cognationis et affiniatis ex libro naturae observata et detecta*. This has the distinction of being the first monograph of a single natural family of plants, for plants were not sorted out into families in those days.

It may be interesting to South African students to know that Morison was succeeded as custodian of the garden at Oxford by Jacob Bobart, a distinguished gardener of German extraction, after whom the South African genus *Bobartia* was named by Linnaeus.

Mentzel, 1682 (1696).—According to Pritzel, a reimpression of Christian Mentzel's *Index nominum plantarum* 1682 (which is at Kew) was published in 1696, and entitled *Lexicon plantarum polyglotton universale*, etc.; two pages, and plates 12–13, are devoted to plants collected by Johann Friedrich Ruecker at the Cape of Good Hope.

Hermann, 1687.—Paul Hermann, Professor of Botany at Leyden, published in 1687 a catalogue of the Leyden garden entitled *Horti Academici Lugduno-Batavi Catalogus*, etc., with finely executed, though small, engravings of as many as thirty-four Cape plants. On page 53 he gives a very good figure of *Ceropegia variegata* introduced by Heurnius and described by à Stapel. Hermann himself calls it "*Apocynum humile aizoides, siliquis erectis, africanum*". A photographic copy of his beautiful plate is here reproduced (see p. 558).

APOCYNUM HUMILE AIZOIDES, SILI-
QUIS ERECTIS, AFRICANUM.



Hermann's figure of *Ceropogia variegata*, published in 1687.

RANUNCULUS AETHIOPICUS



Commelin's plate of *RANUNCULUS AETHIOPICUS foliis rigidis floribus ex luteo virescentibus* (*KNOWLTONIA VESICATORIA* Sims), published in 1697.

Among the other illustrations are five species of *Mesembryanthemum* (sensu lato) under the name "Ficus", and several figures of *Pelargonium* species.

Plukenet, 1691–1705.—From 1691 to 1705 Dr. L. Plukenet's *Opera omnia botanica in sex tomos divisa* were published. A few South African plants are figured in the *Phytographia*, though the illustrations are rather poor, and not of much importance to the South African student. Many of the species were identified by Giseke (see p. 568) in 1779, and he applied the Linnean names to all he was able to recognise. His work is entitled *Index Linneanus in Leonhardi Plukenetii opera botanica*.

Plukenet assisted Ray in the arrangement of the second volume of the *Historia Plantarum*. According to accounts, he was a botanist of some pretensions, but of great modesty, and he published little or nothing until he was fifty years of age. Towards the end of his life Plukenet was appointed by Queen Anne to be Superintendent of the Garden at Hampton Court and Royal Professor of Botany.

Jan Commelin, 1697–1701.—The great work of Jan Commelin, Professor of Botany at Amsterdam, was published between 1697 and 1701, some years after his death. Its title is *Horti Medici Amstelodamensis rariorum, tum orientalis, quam occidentalis Indiae, aliarumque peregrinarum plantarum magno studio ac labore, sumptibus civitatis Amstelodamensis longa annorum serie collocatarum descriptio et icones ad vivum aeri incisae*.

This posthumous work of two folio volumes contains splendid coloured pictures of many Cape plants, the first of which, "*Ranunculus aethiopicus*, etc." (*Knowltonia vesicatoria* Sims), is here reproduced. For example, facing p. 81 is a very fine figure of *Antholyza ringens*, named *Gladiolo aethiopica similis planta augustifolia, caule hirsuto, flore rubicundissimo*. The text is in Latin and Dutch, side by side.

Hermann, 1698.—P. Hermann's *Paralysus Batavus, innumeris exoticus curiosis herbis*, etc., was published in 1698, and another edition in 1705. It is a posthumous work, beautifully illustrated, and prefaced with an ode to Hermann by E. Hannes. A few South African plants are illustrated, but they are not sufficiently important to enumerate here.

Volckamer, 1700.—J. G. Volckamer's *Flora Noribergensis*, published in 1700, contains a few plates, nearly all of which are of South African plants, no doubt at that time objects of considerable curiosity. This is an alphabetical catalogue of the Nuremberg garden, in Bavaria, South-west Germany.

Olearius, 1713.—J. C. Olearius, *Aloedarium historicum* (Historische Beschreibung derjenigen Aloen, etc.) (Arnstedt, 1713), pp. 48, tt. 2.

Bradley, 1716–1727 (ed. 2 : 1734).—Richard Bradley, Professor of Botany at Cambridge, published from 1716 to 1727 his *History of Succulent Plants, containing the Aloes, Ficoids, Torch-Thistles*, etc. A second edition appeared in 1734, and contains a number of coloured or partly coloured illustrations of South African plants, particularly *Mesembryanthemum* (sensu lato). On the Kew copy of this second edition the late Dr. N. E. Brown has pencilled a few of the modern names.

Kolbe, 1719.—Peter Kolbe published at Nuremberg in 1719 a work of two volumes on the Cape, entitled *Beschreibung des Vorgebirgs der guten Hoffnung und der Hottentotten*. An edition in Dutch was published in Amsterdam in 1727. I have seen only the latter. It contains a list of plants, many of them with a binomial nomenclature—i.e., many years before its general introduction by Linnaeus in 1753. The maps of the country around the Cape are intensely interesting.

Boerhaave, 1720.—Hermann Boerhaave's *Index alter plantarum quae in horto academico Lugduno Batavo aluntur*, published in 1720, contained a large number of figures of Cape plants, especially PROTEACEAE. Many of these plates are quoted in the pages of the *Flora Capensis*. There are several *Proteas*, which were called by the generic name of *Lepidocarpodendron*, while most of the other genera of PROTEACEAE, such as *Leucadendron*, were classed under *Conocarpodendron*. Indeed, nearly all the figures in the book are of PROTEACEAE.

Boerhaave, ed. ii. 1727.—A second edition appeared in 1727. It may be noted here that Linnaeus' first edition of his *Genera Plantarum* was dedicated to Boerhaave.

Tilli, 1723.—M. Tilli, *Catalogus plantarum Horti Pisani* (Florence, 1723), pp. 187, tt. 50, contains figures of a few South African plants (*Aloe*, etc.).

Jan Burman, 1737.—Jan Burman, Professor of Botany at Amsterdam (born 1706, died 1779), in his *Thesaurus Zeylanicus*, gives a list of nearly 1000 plants collected at the Cape by Hermann, and a second list of about 400 of those collected by Oldenland and Hartog. A further appendix shows an interesting list of the plants introduced at that time into South Africa. The book is dated 1737. It was reprinted in 1768 by his son, Nicolaas Laurens Burman, in his famous *Flora Indica*, and arranged after the Linnean system, which had appeared fifteen years before. It is little more than a list of names.

Linnaeus, 1737.—C. Linnaeus, *Genera Plantarum*, the first edition of which appeared in 1737, contained descriptions of many South African genera. As noted above, it was dedicated to Hermann Boerhaave.

Linnaeus, 1737.—C. Linnaeus, *Hortus Cliffortianus* (Amsterdam, 1737). An account of Clifford's garden in Holland; contains descriptions of many South African plants and a few illustrations.

Weinmann, 1737–1745.—J. W. Weinmann, *Phytanthozoiconographia*. Four large volumes published from 1737 to 1745 at Regensburg. The text is in Latin and German, and there are many plates of Cape plants, those of the genus *Aloe* being good.

Jan Burman, 1738–1739.—Jan Burman's more pretentious work, entitled *Decades Plantarum Africanarum*, appeared in separate parts from 1738 to 1739. It contains a beautiful woodcut of the author (here reproduced, see p. 562) and 100 excellent pictures of South African plants, many of which are preserved in the De Lessert Herbarium at the Jardin des Plantes, Paris.

J. Breyn, 1739.—J. Breyn, *Prodromi fasciculi rariorum plantarum primus et secundus*, etc. (Danzig, 1739), pp. 108, 54, tt. 32; contains some South African plants.

Heister, 1753.—L. Heister, of Brunswick, published in Latin in 1753 a folio book of twenty-eight pages and three coloured plates of

Brunsvigia multiflora Ait., a well-known South African plant. A German edition appeared in 1755.

Linnaeus, 1753.—Linnaeus, often styled in Europe the “Father of Botany”, mainly because he was the first to use the binomial system of nomenclature, had only a slight connection with the South African flora. Indirectly, however, he was concerned with it to a considerable extent, because Thunberg, who in turn may be called the “Father of



Frontispiece of Jan Burmann's *Decades Plantarum Africanarum* (1738-9).

South African Botany”, was his pupil. In his famous *Species Plantarum*, published in 1753, the starting point for botanical nomenclature, Linnaeus includes a large number of South African plants. These are indicated as being from either “Aethiopia”, “Africa”, or sometimes more definitely “Caput Bonae Spei”. I have not thought it worth while to go through this work to ascertain the exact number of species known to him from the Cape, but possibly very few were added by the year 1759, when he published the first *Flora Capensis*, a facsimile of the title and a page of which seem worth reproducing (see p. 564).

Linnaeus, 1759 (the first *Flora Capensis*).—Linnaeus published this small *Flora Capensis* at Upsala. It consists of nineteen pages. In

this he lists no less than 502 species of Cape plants. It is interesting to note that he already knew nine species of *Diosma*, six species of *Brunia*, eleven species of *Crassula*, seventeen species of *Erica*, forty species of *Mesembryanthemum*, twenty-four species of *Pelargonium* ("Geranium"), but only seven species of *Senecio*; there are no orchids.

This interesting little work contains Linnaeus' impressions of the Cape flora. He gives a short enumeration of the animals, a very

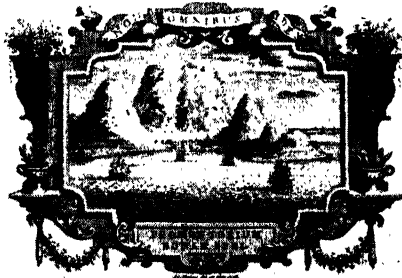
JOANNIS BURMANNI.

*Med. Doct. & in Horto Medico Amstelædameni
Botanices Professoris,*

RARIORUM AFRICANARUM PLANTARUM,

*Ad vivum delineatarum, Iconibus ac descriptionibus
illustratarum*

DECAS SECUNDA.



AMSTELÆDAMI,

Apud HENRICUM BOUSSIÈRE.

MDCCXXXVIII.

Title page of Jan Burmann's *Decades Plantarum
Africanarum* (1738-9).

brief account of the climate, and the cultivated plants which grow there from Europe and Asia. Then follow a few notes on the collectors Heurnius,¹ Hermann, Oldenland and Hartog.

He says of Cape plants:—

"Africanæ plantæ, imprimis autem capenses, faciem habent asperam, duriusculum et obscurum, ut Botanici sæpe peritissimi in hortis Botanophilorum primo intuitu dignoscant africanas plantas ab illis, quod verbis

¹ This is the correct spelling, and not "Huernius", as used for the well-known genus in *Asclepiadaceæ*.

definire difficilius est, quam ipso usu addiscere. Unde etiam *Rajus* in praefatione ad supplementum p. VII. notandum, inquit, plures fruticum et suffruticum species capenses, ramulis et surculis, foliis adeo crebris et confertis, ut eos penitus contegant et occultent, undique cinctis, circa hoc

Q. F. F. Q. S.
FLORA
CAPENSIS,
 QUAM
 EX CONSENSU EXPERIENT. FACULT. MED.
 IN ILLUSTR. LYCÆO UPSALIENSI,
 SUB PRÆSIDIO
 VIRI NOBILISSIMI ET EXPERIENTISSIMI
DN. DOCT. CAROLI
LINNÆI,
 EQUITIS AURATI DE STELLA POLARI,
 SÆ RÆ MÆTIS ARCHIATRI,
 MED. ET BOTAN. PROFESSORIS REG. ET ORD.
 ACADEMIÆ UPSALIENS. STOCKHOLM. PETROPOL.
 BEROL. IMPER. LONDINENS. MONSPEL.
 TOLOS. FLORENT. SOCIJ,
 PUBLICO EXAMINI SUBMITTIT
CAROLUS HENR. WÄNNMAN,
 UPSALIENSIS.
 IN AUDIT. CAROL. MAJOR. DIE XXX. MAJI,
 ANNI MDCCLIX.
 H. A. M. S.

UPSALIÆ

Henricus Curator

Facsimile of the title page of the first *Flora Capensis*, by Linnaeus (1759).

promontorium reperiri, quam in toto praeterea, quod hactenus noverim, terrarum orbe.”¹

¹ “African plants, especially from the Cape, have a rough appearance, are rather woody and inconspicuous, so that learned botanists in gardens can

Linnaeus, 1760.—In 1760 Linnaeus published his *Plantae Africanæ Rariores* (Upsala), forming a part of the *Amoenitates Academicæ* (Vol. VI), a publication devoted to physics, medicine and botany.



FLORA CAPENSIS.

MONANDRIA.		<i>Commelina</i>	<i>africana.</i>
MONOGYNIA.		<i>Schænus</i>	<i>capensis.</i>
<i>Canna</i>	<i>indica.</i>	<i>Cyperus</i>	<i>Flaspan.</i>
<i>Amomum</i>	<i>Zingiber.</i>		<i>minimus.</i>
	<i>Gr. paradisi.</i>	<i>Scirpus</i>	<i>capillaris.</i>
DIANDRIA.		DIGYNIA.	
MONOGYNIA.		<i>Cynofurus</i>	<i>egyptius.</i>
TRIANDRIA.		TETRANDRIA.	
MONOGYNIA.		MONOGYNIA.	
<i>Olea</i>	<i>capensis.</i>	<i>Leucadendr.</i>	<i>racemosum.</i>
<i>Eranthemum</i>	<i>capense.</i>		<i>proteoides.</i>
<i>Salvia</i>	<i>afr. carulea.</i>		<i>cancellatum.</i>
	<i>afr. lutea.</i>		<i>Lepidocarpodendr.</i>
	<i>Æthiopis.</i>		<i>rep ns.</i>
MONOGYNIA.			<i>acaulon.</i>
<i>Antholyza</i>	<i>ringens.</i>		<i>Scolymoccephalus.</i>
	<i>æthiopica.</i>		<i>Cinaroides.</i>
	<i>Cunonia.</i>		<i>cucullatum.</i>
	<i>Merrania.</i>		<i>Hypophyllocarp.</i>
<i>Gladiolus</i>	<i>spicatus.</i>		<i>Conocarpodendr.</i>
	<i>angustus.</i>		<i>Cyanoides.</i>
	<i>ramosus.</i>		<i>Serraria.</i>
	<i>capitatus.</i>		<i>argentea.</i>
	<i>alopecuroides.</i>	<i>Protea</i>	<i>fusca.</i>
<i>Ixia</i>	<i>alba.</i>		<i>orientalis.</i>
	<i>bulbifera.</i>	<i>Cephalanthus</i>	<i>africana.</i>
	<i>corymbosa.</i>	<i>Scabiosa</i>	<i>verticillata.</i>
	<i>africana.</i>	<i>Spermacoce</i>	<i>Sarcocolla.</i>
<i>Wachendorfia</i>	<i>thyrsiflora.</i>	<i>Penæa</i>	<i>mucronata.</i>
	<i>paniculata.</i>		<i>squarrosa.</i>
	<i>villosa.</i>		

B 2

Blæria

A page from the first *Flora Capensis*, by Linnaeus (1759).

This paper deals with plants collected at the Cape by Heurnius, Hermann, Oldenland, Alex. Brown, and Hartog. Alexander Brown was

distinguish at a glance African plants from others, which is more difficult to define in words than to demonstrate in practice. Thus also Ray in the preface to the Supplement p. VII, says it should be noted that more Cape species of shrubs and undershrubs with branchlets and shoots so densely covered everywhere with leaves that they almost hide them are found around this Cape than anywhere else in the whole world, so far as I know."

an Englishman, a surgeon in the East Indies, who collected at the Cape whilst *en route* to the East. The other collectors were from Holland. In this work 100 additional species were described, including some orchids. The genera *Heurnia* (Huernia) (ASCLEPIADACEAE), *Hermannia* (STERCULIACEAE), *Oldenlandia* (RUBIACEAE), and *Hartogia*, commemorate the work of these early Cape travellers.

J. Burman, 1757.—J. Burman, *Wachendorfia* (Amsterdam, 1757), pp. 4, t. 1. Two South African species figured; another impression of this appeared in 1771.

Kniphof, 1757–1764.—J. H. Kniphof in 1757–1764 published two volumes entitled *Botanica in Originali seu Herbarium vivum plantarum*, etc. The coloured figures, some of which are of South African plants, bear a great resemblance to dried specimens in which the natural colouring has been partly preserved.

N. L. Burman, 1759.—N. L. Burman, in 1759, published at Leyden the first treatise on the genus “Geranium” (= PELARGONIUM partly), in a work of fifty-two pages, entitled *Specimen Botanicum de Geraniis*. Seventy-four species are described in this work, and two plates of woodcuts illustrate ten species. The greater number are South African.

N. J. Jacquin, 1764–1771.—N. J. Jacquin’s *Observationum botanicarum iconibus ab auctore delineatis illustratarum*, Parts 1–4, Vienna, 1764–1771, is of little importance to South African botanists, only very few species being included therein, and this remark applies to the same author’s *Hortus botanicus Vindobonensis*, etc., published from 1770 to 1776, with 100 plates.

N. J. Jacquin, 1781–1793.—But from a South African point of view, N. J. Jacquin’s *Icones Plantarum Rariorum*, 1781–1793, consisting of three volumes, is very important indeed, as many species are figured in colour for the first time, including a large number of South African Monocotyledons (Vol. II) and of *Pelargonium* (Vol. III), the plates being large and well drawn. Fuller descriptions of some of these are given in his five volumes of *Collectanea ad botanicam, chemiam et historiam naturalem spectantia cum figuris* published from 1786 to 1796.

N. J. Jacquin, 1794.—This prolific author also wrote a monograph of the genus *Oxalis*, entitled *Oxalis monographia iconibus illustrata*, Vienna, 1794, with excellent coloured plates and dissections of a large number of Cape species. The same author’s monumental work, *Plantarum rariorum horti caesarei Schönbrunnensis descriptiones et icones*, Vienna, 1797–1804, is largely devoted to South African plants, the genera *Hermannia*, *Pelargonium*, *Arctotis* and *Mesembryanthemum* (sensu lato) taking a prominent place. Likewise his work devoted to *Stapelia*, *Stapeliarum in hortic Vindobonensibus cultarum descriptiones figuris coloratis Illustratae*, published at Vienna in 1806, with sixty-four coloured plates. This author’s final work, *Fragmenta botanica figuris coloratis illustrata*, 1809, contains figures of only a few Cape plants.

D. de la Roche, 1766.—D. de la Roche, *Descriptiones plantarum aliquot novarum Dissertatio*, Lugd. Batav., 1766, pp. 35, tt. 5. A small work describing a few monocotyledons, with uncoloured plates; of little importance.

Bergius, 1767 (September).—In 1767 P. J. Bergius published at Stockholm his *Descriptiones Plantarum ex Capite Bonae Spei*. This

book is inscribed to Michael Grubb, after whom the genus *Grubbia* was named by Bergius, and consists of 361 pages of very full Latin descriptions of Cape plants, with five plates depicting ten species, as follows :—

- Tab. I. *Colpoon compressum* Berg.; *Nothria repens* Berg.
(*Frankenia*).
- Tab. II. *Grubbia rosmarinifolia* Berg.
- Tab. III. *Melasma scabrum* Berg.; *Dilatris corymbosa* Berg.
- Tab. IV. *Stilbe vestita* Berg.; *Disa uniflora* Berg.
- Tab. V. *Thamnochortus fruticosus* Berg.; *Lidbeckia pectinata*
Berg.; *Laurembergia repens* Berg.

In this work the following genera were described for the first time : *Dilatris*, *Stilbe*, *Aulax*, *Colpoon*, *Grubbia*, *Nectandra*, *Nemia*, *Melasma*, *Nothria*, *Cyphia*, *Lidbeckia*, *Disa*, *Laurembergia*, *Thamnochortus*.

It contained descriptions of seventeen species of *Leucadendron*, six of *Brunia*, twenty-nine of *Erica*, eleven of *Aspalathus*, five of *Psoralea*, nineteen of *Gnaphalium* (mostly now *Helichrysum*), eight of *Senecio*, and nine of *Arctotis*. I give this list to show that already in 1767 a fair number of South African plants were known in Europe. The plants described by Bergius were brought from the Cape by Michael Grubb, a China merchant, who took home to Sweden a parcel of Auge's plants. The late Professor Macowan complained¹ that Bergius did not mention the fact that the plants had been collected by Auge. Though this would now be regarded as a very serious omission, one must remember that Auge was looked upon as a servant or "mere gardener", as Thunberg called him. And Michael Grubb was perhaps really a *vir generosus atque nobilissimus*, as described by Bergius, and not "perfidious and to be dragged up for scarification", as Macowan would have it, for the omission was perhaps the work of Bergius himself, and not of the worthy M. Grubb.

Linnaeus, Mantissa prima, 1767 (November).—In the same year, 1767, appeared Linnaeus' *Mantissa prima*, which included descriptions of various new genera and species from the Cape as well as from other parts of the world. According to Sprague,² this was published in November 1767, whilst Bergius' book appeared in September of that year. This is a very important point, for several of Bergius' names have on that account priority over those of Linnaeus, as the same species were in some cases described for the first time under different names in the two books. Linnaeus complained to Burmann that Bergius had never shown him even a single one of his Cape plants, and had published his *Descriptiones* without changing the names of sundry new species, which were conspecific with those described in the *Mantissa*, although he (Bergius) had seen proofs of the latter at the printers. There have been a few similar cases in the history of botany!

Taking the names in Bergius' sequence, therefore, the following have precedence over those of Linnaeus and of a few other authors : ***Agathelpis parviflorum* (Berg.) Hutch. comb. nov. (*Eranthemum parviflorum* Berg.; *E. parvifolium* Linn. Mant. alt. 1713; *A. parvifolia***

¹ See *Trans. S. Afr. Phil. Soc.*, 4: xxxiv (1886).

² Sprague in *Kew Bulletin*, 1929 : 88.

(Linn.) Choisy. *Salvia chamelaeagnea* Berg. (*S. paniculata* Linn.). *Sarcocolla tetragona* (Berg.) Salter (*Penaea tetragona* Berg. ; *P. Sarcocolla* Linn. *Sarcocolla squamosa* Endl.).

Miller (ed. 8, 1768).—In 1768 appeared a monumental English work in the shape of Philip Miller's eighth edition of his *Gardeners' Dictionary*, the first book in this country to be arranged after the Linnaean system. Philip Miller was a Fellow of the Royal Society, and was gardener to the Worshipful Company of Apothecaries at their Botanic Garden in Chelsea, and Member of the Botanic Academy at Florence. This is a very fine book, considering the date, and contains many references to South African plants.

Nicolaas Burman, 1768.—As already noted (p. 561), Nicolaas Burman, the son of Jan Burman, reprinted his father's list of Cape Plants as a supplement to his *Flora Indica*.

Linnaeus, 1771.—In 1771 Linnaeus published his *Mantissa Altera* (second supplement), containing species additional to the second edition of the *Species Plantarum* of 1762–1763. Some of the South African names in this work, however, are antedated by those of Bergius (see p. 567).

Linnaeus fils, 1781.—The above was soon followed by another work, the *Supplement* of Linnaeus' son, which was published in 1781, and contains further additions to the second edition of the *Species Plantarum*. This supplement was published three years after the death of the elder Linnaeus.

Linnaeus, 1774.—Linnaeus' *Systema Vegetabilium*, 6 vols., 844 pp., although the first under this title, was called the thirteenth edition, because the vegetable kingdom had already been described in twelve editions of the *Systema Naturae*. It reached a sixteenth edition, which, with a supplement, appeared in 1828.

N. Meerburg, 1775–1789.—N. Meerburg, *Afbeeldingen van Zeldzaame Gewassen* (Leyden, 1775). Contains a few coloured plates and descriptions of Cape plants ; reissued as *Plantae rariores vivis coloribus depictae* (Leyden, 1789).

Thunberg, 1775–1818.—Between 1775 and 1818 Thunberg published at Upsala many short papers as academical dissertations and in various journals. He dealt with the following genera : *Hydnora*, *Ehrharta*, *Retzia*, *Gardenia*, *Protea*, *Oxalis*, *Iris*, *Ixia*, *Gladiolus*, *Aloe*, *Erica*, *Albica*, *Moraea*, *Restio*, *Wildenovia*, *Hermannia*, *Cyanella*, *Diosma*, *Melanthium*, *Drosera*, *Hydrocotyle*, *Arctotis*, *Aspalathus*, *Blaeria*, *Antholyza*, *Phyllica*, *Brunia*, *Thesium*, *Borbonia*, *Echitis*, *Lycium*, *Crassula*, *Mesembryanthemum*, *Dilatris*, *Penaea*, *Hypoxis*, *Cliffortia*, *Montinia*, *Papiria*, *Aitonia*, *Falkia*, *Cycas*, *Avena*, *Carex*, *Gorteria*, *Chironia*, *Oenanthe*, *Trachelium*, *Lobelia*, *Rhamnus*, *Solanum*, *Celastrus*, *Poa*, *Diosma*, *Hermas*, *Protea*, *Galium*, *Campanula*.

Giseke, 1779.—In 1779 P. D. Giseke, of Hamburg, published an interpretation of Plukenet's works (1691–1705), under which a reference will be found (p. 560). The title of Giseke's work is *Index Linneanus in Leonhardi Plukenetii opera botanica*.

La Marck, 1783–1817.—Jean La Marck wrote the botanical volumes for the great French work entitled *Encyclopédie Méthodique*. There are thirteen volumes ; the first is dated 1783 and the last appeared in 1817. **Poiret.**—Vols. 5–13 were written by J. L. M. Poiret, the

last five being supplementary to the first eight. There are six volumes of 1000 illustrations, which include many South African plants. These pictures are usually very good, with numerous dissections of floral parts and fruits. Accompanying the plates are three separate volumes with short diagnoses of each species, with the genera arranged according to the Linnaean system.

This great work contained descriptions of all the known flowering plants, and was thus a prototype of the great De Candollean *Prodromus* commenced seven years later, in 1824.

L'Héritier, 1784–1785.—C. L. L'Héritier, *Stirpes novae aut minus cognitae*, etc. (Paris, 1784–1785), pp. 184, tt. 84. Contains figures of about ten South African plants.

Curtis (and others), 1787–to date.—The *Botanical Magazine* was founded by William Curtis in 1787, and is still being published. The early volumes contained many coloured figures of Cape plants, which were then much grown in European greenhouses. The first fourteen volumes were edited by Curtis, and subsequent editors have been J. Sims, S. Curtis, Sir W. J. Hooker, Sir J. D. Hooker, Sir W. Thiselton-Dyer, Sir David Prain, Dr. O. Stapf, Sir Arthur W. Hill, the late Director of Kew, and A. D. Cotton. The magazine is the oldest botanical periodical, and it seems remarkable that during the 158 years of its existence not more than ten editors have guided its fortunes, the longest period being that of Sir Joseph Hooker, who also wrote most of the text for thirty-nine years.

L'Héritier, 1787–1788.—C. L. L'Héritier, *Geraniologia* (Paris, 1787–1788), tt. 44. Contains very beautiful engravings of South African *Pelargonium*, and *Monsonia*, but no text.

Roth, 1787.—A. W. Roth, *Botanische Abhandlungen und Beobachtungen*, Nürnberg, 1787, pp. 53–65. A short paper with descriptions of Cape plants entitled "Observationes plantarum e Capite Bonae Spei". The following species are described: *Iris tricuspidata* L., *Gentiana exacoides* L., *Tillaea capensis* L., *Melanthium monopetalum* L., *Pharnaceum incanum* L., *Crassula ciliata* L., *Polygala oppositifolia* L., *P. bracteolata* L., *Borbonia trinervia* L., *Selago coccinea* L., *Pteronia rigida* Berg., *Stoebe aethiopica* L., *Arctotis paradoxa* L., *Lobelia bulbosa* L., *Erica cerinthoides* L., *E. corifolia* L., *E. verticillata* Berg., *Ornithogalum arabicum* L., *Echium argenteum* L., *Hermannia trifoliata* L., *Geranium papilionaceum* L., and an unnamed *Trifolium*.

This work is not of great importance, being additional observations and descriptions of known species, drawn up from material collected at the Cape by Von Prehn. Roth was a physician at Bremen.

Thunberg, 1788–1793.—Thunberg's *Travels in Europe, Africa and Asia*, 4 vols. Contains many botanical notes. The original edition in Swedish was published at Upsala from 1788 to 1793; the first two volumes deal with his African travels. **1794–1795.**—The English edition was published in London from 1794 to 1795. Extracts from this will be found in the chapter on "Botanical Exploration."

Aiton, Hortus Kewensis, 1789.—The first Curator, or head gardener, of the Royal Garden at Kew, William Aiton, was also a keen botanist, though much has been written ¹ in an endeavour to prove the con-

¹ See *Journ. of Botany*.

trary, and he published in 1789 a famous work, the *Hortus Kewensis*. This is a catalogue of the plants in cultivation at Kew, and contains a very large number of Cape plants, most of them introduced by Francis Masson. The "Hortus Siccus", or herbarium of dried specimens, made by Aiton is now at the Natural History Museum, South Kensington, for which it was acquired by Sir Joseph Banks, who with Solander had accompanied Captain Cook round the world.

Hortus Kewensis, ed. 2 (1810-1813).—Just as there were a Linnaeus, father and son, so there were also an Aiton and son, for William T. Aiton succeeded his father as gardener to the King. He published a second edition of the *Hortus* from 1810 to 1813, and an abridged edition of this was published in 1814 for the use of practical gardeners. At that date South African plants occupied a leading position in the greenhouses of Britain and in Western Europe.

W. T. Aiton, 1793-1800.—Besides the second edition of the *Hortus Kewensis*, W. T. Aiton also published *Delineations of Exotic Plants cultivated in the Royal Garden at Kew, drawn and coloured . . . by Francis Bauer, botanick painter to His Majesty*. Appropriately enough, all the thirty plants figured are South African, and all belong to the genus *Erica*. These illustrations were beautifully reproduced from the originals, the lithographer being Mackenzie, and there are very fine coloured dissections shown. Indeed, so good were the paintings, that Aiton says :—

"It will appear singular, at first sight, that engravings of plants should be published without the addition of botanical descriptions of their generic and specific characters; but it is hoped, that every Botanist will agree, when he has examined the plates with attention, that it would have been an useless task to have compiled, and a superfluous expence to have printed, any kind of explanation concerning them; each figure is intended to answer itself every question a Botanist can wish to ask, respecting the structure of the plant it represents."

The plates are large (55 × 38 cm.).

Haworth, 1794.—A. H. Haworth in 1794 published his *Observations on Mesembryanthemum*, with descriptions of over 130 species (London, 1794); pp. 480.

Jacquin, 1794.—N. J. Jacquin, *Oxalis Monographia Iconibus Illustrata* (Vienna, etc., 1794); pp. 120, tt. 81. Contains good pictures of the South African species known at that time.

Jacquin, 1794-1804.—N. J. Jacquin, *Plantarum Rariorum Horti Caesarei Schoenbrunnensis Descriptiones et Icones*, 4 vols. (Vienna, 1797-1804). Contains Latin descriptions and large coloured pictures of many South African plants grown in the Royal Garden at Schönbrunn, Austria. Indispensable to students of the South African flora.

Thunberg, 1794.—In 1794 the first part of Thunberg's *Prodromus Plantarum Capensium* appeared. It was dedicated to Niculus Burmann as follows :—

Viro nobilissimo
Domino
Nicol. Laur. Burmanno,
Med. Doct. et Pract. Amstelaedamens.
Nec non Botan. Professori
Illustrissimo, Celeberrimo !

Meo prae aliis patrono et fautori
longe optimo !

Itineris africanae et japonici mea auctori
faventissimo !

in

Aeternum gratissimae mentis testimonium
hasce pagellas, uti debui, sacras volui

C. P. Thunberg.

Pt. II, 1800.—All South African plants known up to the time were described in this and in the second part, the latter published in 1800. They were arranged after the Linnean system. In order to show the South African student how artificial was that system, we may glance at pp. 2–6, dealing with Class II, DIANDRIA, MONOGYNIA, in which the following genera are associated: [*Olea*, *Jasminum*], *Veronica*, [*Ophrys*, *Arethusa*, *Serapias*, *Limodorum*, *Orchis*, *Disa*, *Satyrium*], *Lemna*, *Salix*, *Ancistrum*, *Gunnera*. The names of genera enclosed in each set of square brackets are actually related, and are still associated in the same families, but the others are of very diverse affinities. *Triandria*, with three stamens, of course brought all the IRIDACEAE together, but it also included *Valeriana*, *Ficus*, *Ruscus*, *Bryonia*, *Cucumis*, *Tragia*, *Typha*, etc. In this work short descriptions of a line or one and a half lines are given of each species and genus.

Thunberg gives a list of *authors* who had previously written on South African plants. These were Plukenet, Boerhaave, Hermann, Breyne, Commelin, Burmann, Linnaeus, Berg, Jacquin and others. *Botanical travellers* were Heurn, Hermann, Oldenland, Hartog, Koenig, Auge, Sparrman, Paterson, his own companion Masson, and himself.

Masson, 1796.—A notable contribution to the early literature of South African botany was Francis Masson's *Stapeliae Novae*, or a collection of several new species of that genus, discovered in the interior parts of Africa. Masson had been compelled to leave the Cape for fear of losing his collection of living plants because of an expected invasion. He employed himself during this enforced vacation in writing this remarkable work on the genus *Stapelia*. It was inscribed to the then reigning monarch, King George III. He gives figures and descriptions of forty-one species of *Stapelia*, the paintings being generally considered to have been made by a soldier artist named Oldenburg.

Andrews, 1797–1812.—Between the years 1797 and 1812 the brush and pen of Henry Andrews,¹ of No. 5, Knightsbridge, were very active indeed with South African plants. His *Botanists' Repository*, which appeared during the above period, contained coloured pictures of very many South African species. Andrews was a botanical painter and engraver, and was the son-in-law of John Kennedy, a partner with Lee in a nursery at Hammersmith.

Wendland, 1798–1823.—J. C. Wendland, *Ericarum icones et descriptiones*, Hanover, 1798–1823. Two thick volumes of coloured plates of *Erica*; very good pictures, with dissections of floral parts, the latter,

¹ For an account of Andrews, see *Journ. Bot.*, 1916 : 236.

unfortunately, rather small. This work is dedicated to George III, King of Great Britain.

A. P. de Candolle, 1799–1829.—A. P. de Candolle, *Plantarum Historia Succulentarum*, Paris, 1799–1829, 159 pp., 185 col. pl. Contains pictures of many Cape succulents.

Andrews, 1802–1830.—The horticultural history of the genus *Erica* towards the close of the eighteenth century was singularly like that of its fellow member of the family, *Rhododendron*, at the close of the nineteenth century. In both cases vast numbers of species remained unknown in gardens. Thus Andrews, in the introduction to his first volume of *Coloured Engravings of Heaths*, published in 1802, says that prior to 1772 the only *Ericas* known in British gardens were *E. vulgaris*, *E. tetralix*, *E. cinerea* and *E. vagans*, natives of Britain, *E. arborea* from Madeira, the *E. herbacea* or *E. carnea* from Switzerland, *E. mediterranea* from Minorca, and *E. scoparia*, *E. viridi-purpurea*, *E. australis*, *E. ciliaris* and *E. umbellata* from Portugal. A few African species were known only by name. In 1771 seeds of two species were received at the Hammersmith nursery, from the Cape, the first to flower proving to be *E. tubiflora* and the other *E. concinna*. Two years afterwards, continues Andrews, Francis Masson, botanical collector to His Majesty at the Cape, “laid the foundation for the celebrity of that superb collection at Kew, which for many years, with unrivalled lustre, far outshone all others”. In 1774 Masson introduced eighteen species from South Africa, and thence, according to Andrews, “The accession was so rapid that it would be difficult . . . to ascertain the precise date when most of the remaining species were introduced, as many different collectors were about this time, or shortly after, producing in their collections new species to which they each claimed the honour of priority of introduction”. The same story might be written for *Rhododendron* during the last forty years.

In 1789 the *Hortus Kewensis* listed forty-five species of *Erica* as being in cultivation at Kew, whilst only thirteen years later, in 1802, there were growing in the nursery of Messrs. Lee and Kennedy, of Hammersmith, no less than 228 species and varieties.

Redouté, 1802–1816.—P. J. Redouté, *Les Liliacées*, 486 pp., 486 col. pl., Paris, 1802–1816. Contains beautiful large coloured figures of Cape LILIACEAE and IRIDACEAE; a very fine work in eight volumes.

Salisbury, 1802.—R. A. Salisbury, “On the Species of *Erica*”, *Trans. Linn. Soc.*, vol. 6, pp. 316–388, 1802. An account of the known species giving short Latin diagnoses of each.

Haworth, 1803.—A. H. Haworth, *Miscellanea Naturalia*, etc., 1803, pp. 204. Contains accounts of *Mesembryanthemum*, *Tetragonia*, *Portulaca*, and other small genera.

Andrews, 1804.—H. C. Andrews, *The Heathery, or a Monograph of the Genus Erica*. Contains Latin and English descriptions of the known species, with very delightful coloured plates in four volumes (1804–1812). A second edition in six volumes appeared in 1845.

Andrews, 1805.—In 1805 appeared the first volume of Andrews, *Geraniums : or a Monograph of the Genus Geranium* (= *Pelargonium*). This is a fine work, which ran into two volumes, and contained 125, coloured plates, executed in very good style. There were nomenclatural difficulties even in those days ! He says in the introduction :—

"This genus has already sustained two innovations; which if we were to adopt, we should have six more to make in addition, being already in possession of that number of an equally distinct character with the *Pelargonium* and *Erodium*, the former having seven fertile tips, the latter five only fertile, and these not always permanent; so that, if such generic divisions were generally adopted, the approach to botanic science would be so choked up with ill-shaped, useless lumber, that, like a castle in a fairy tale, guarded by hideous dwarfs, none but a Botanic Quixote would attempt investigation.

"That it may not be imagined the author promulgates any system supported by one party in opposition to those advanced by another, he takes this opportunity of observing that at present he walks alone; but in the descriptions of five volumes of his *Botanist's Repository* he was assisted by gardeners and cultivators; and in the sixth and last volume by a botanist whose opinions were diametrically opposite to those of the former. *The author, therefore, thinks it much better to try his own strength, however weak, than to remain tottering between the support of two such unequal crutches.*"

N. J. Jacquin, 1806.—N. J. Jacquin, *Stapeliae* (Vienna, 1806). A very fine work on *Stapelia*, with Latin descriptions and sixty-four large coloured pictures.

Thunberg, 1807–1813.—In 1807 appeared the first part (pp. 1–144) of a more ambitious *Flora Capensis* by Thunberg, with much longer descriptions. The preface contains short accounts of the country and climate and fuller details about botanical collectors and botanists, to the list of which are added the names of Kolbe, Grubb, Banks and Solander, Sonnerat, Oldenburg, Forster (father and son), and Lady Ann Monson. To the list of authors were included the titles of their works, and the following names added: Aiton, Masson, and Thunberg himself. Of himself as a traveller and collector Thunberg says:—

"Thunberg, Carol, Petrus, Suecus, ex occasione, quam in Florae meae japonicae praefamine indicavi, ad hasce Australis orbis oras perductus, ab Anno 1772 usque ad Annum 1775, omnis generis Naturalia, praecipue vero florae capensis dilectissimas Copias sedula et indefessa manu quaesivi, collegi, examinaui et descripsi. Hunc in finem plura suscepi itinera, saepius molestiarum et periculi plena, imprimis vero quotannis ad remotiores regiones, itinere per plures menses producto, penetravi; atque sic per

*Dunas arenosas, Rivos insidissimos,
Carro aridissimas, Campos undulatos,
Littora salsa, Colles lapidosas,
Alpes altas, Praecipitia montium,
Fruteta spinosa, Sylvasque inconditas,*

pericula vitae adii, feroces gentes et bruta prudenter elusi, Thule hujus australis gazas speciosas detegendi gratia, laetus cucurri, sudavi et alsi."¹

On p. 17 is a list of plants cultivated in the Colony, the *Opuntia* ("Cactus ficus") already being introduced. He says of this: "Cactus

¹ I, Carl Peter Thunberg, a Swede, having been led to these shores of the Southern World under the circumstances given in the preface to my *Flora Japonica*, from the years 1772–1775, have sought out, carefully and diligently, collected, examined and described, natural objects of all kinds, especially the wonderful riches of the Cape flora. With this object I undertook several journeys, often fraught with hardships and dangers. Indeed at first I penetrated every year to the more remote regions, the journeys extending to several months; and thus through sandy dunes, treacherous ravines, the parched Karoo, undulating plains, salty shores, stony hills, lofty alps, mountain precipices, spiny scrub, and rough woods, I met the dangers of life; I prudently eluded ferocious tribes and beasts, and for the sake of discovering the beautiful plants of this southern Thule, I joyfully ran, sweated and chilled.

ficus spontaneus quandoque et etiam pro sepibus vivis cultus occurrit."

Knight, 1809.—In 1809 a remarkable work appeared devoted entirely to the South African PROTEACEAE. This was published by Joseph Knight, a Fellow of the Horticultural Society, and a nurseryman at Chelsea. He approached his task with becoming diffidence, for even at that early date there seemed to have developed a rather wide gulf between botanists and cultivators. He quotes the experience of a celebrated engineer who said that to write an account of the Eddystone Lighthouse had caused him more concern than the construction of the building itself. With his account of the PROTEACEAE he found himself in a similar predicament. Knight had been gardener to George Hibbert, M.P., of Clapham, a lover of plants, who sent out Niven to the Cape for the purpose of enriching his garden with living plants, as well as herbarium specimens. The genus *Hibbertia* was named in his honour by Andrews. Hibbert was a merchant, and his garden contained the most extensive collection of living Proteas ever formed up to that time.

Britten, the late editor of the *Journal of Botany*,¹ says of Knight : "We have no evidence that Knight had the slightest claim to be considered a botanist, and there can be little doubt that the whole of the botanical portion of his work was written by Salisbury." It is a well-known fact that R. A. Salisbury was a man of peculiar temperament, and he was not apparently a *persona grata* with some of his contemporaries. In the Kew copy of Knight's work there is pasted in a letter from Babington to Hooker in 1870 in which he remarks :—

"Knight's PROTEACEAE is very curious if the best part of it was really carried away from a Linnean meeting and appropriated by Salisbury to tease R. Brown. That is the story long since told to me by some of the men of that date."

If this had been the case it is difficult to believe that a man of Knight's position and integrity could possibly ever have written in the preface that "Perhaps few works have greater claims to originality than the present, not a single line being copied from any other". In the state of botany at that time there could have been very little difference between a botanist and horticulturist, and nowadays at any rate it is more fashionable to be both.

Knight frankly acknowledged the assistance he derived from Salisbury's manuscripts, and Salisbury's influence is apparent when he says, "Some new specific names have been proposed, when the old ones were manifestly absurd, or positively false", for Salisbury was notorious for changing names which did not suit his taste or which appeared to be unsuitable. It is probable, also, that Salisbury derived some satisfaction from assisting in the publication of Knight's work in advance of that of Robert Brown, who had at that time in MSS. a classical work on the family, his paper being read before the Linnean Society on January 17th, 1809, but not published until 1811.

It is of interest to present-day plant-lovers to recall that Knight's business as a nurseryman in the King's Road, Chelsea, for which he acquired Hibbert's living collections, was the foundation of the business subsequently carried on under the names of Knight and Perry, and

¹ *Journ. Bot.*, 1886 : 296.

later as Messrs. Veitch and Sons, a firm famous at the beginning of the present century, and the sponsors of E. H. Wilson's first collecting expedition to China.

Brown, 1811.—In 1811 there was published a classical account of the PROTEACEAE by Robert Brown, at that time the Librarian of the Linnean Society, and afterwards the Keeper of the botanical department of the Natural History Museum. Brown had travelled in Australia with Captain Flinders. His account brought our knowledge of the family up to that date, and was a large and painstaking work. As already remarked, some of Brown's work was antedated by that of Knight, many of the latter's names having to be used in preference to those employed in the more learned account by Brown. Circumstances such as this have frequently occurred in the botanical world since that time, and the "pitch queered" of many classical works by the hurried publication of less carefully prepared treatises.

J. F. Jacquin, 1811-1844.—J. F. Jacquin, *Eclogae plantarum rariorum*, etc. (Vienna, 1811-1844); 2 vols. Contain a few South African species; not important.

Thunberg, 1811-1818.—K. Thunberg, *Flora Capensis*. For the first time Thunberg gives full descriptions of the species and their synonymy. The second part (pp. 145-386) of this work was published in 1811, and the third part (pp. 387-578) in 1813. But the book was not a complete "Flora Capensis", for it ends with the genus *Potamogeton*. It was reprinted word for word in two volumes in 1818, the first volume again covering the same ground as the first, and as far as *Potamogeton*, the second volume from *Heliotropium* (*Pentandria*, *Monogynia*) as far as *Limeum* (*Heptandria*).

C. H. Wehdemann, MSS. and drawings of Cape plants, 1811-1819.—Three albums of coloured drawings and MSS. of Cape plants by C. H. Wehdemann are known to exist. One is in the botanical library of the British Museum (Natural History), bequeathed by General Thomas Hardwicke in 1836. It is dated by him "Cape Town 2nd January 1812", and contains sixty drawings, initialled by "C.H.W. fec.", which are mounted opposite to copies of them, initialled "J.W.B." About half the species are accompanied by descriptive notes in Hardwicke's writing.

A second album is in the possession of Mr. Sidney Mendelssohn, and was examined by the late Dr. N. E. Brown, who found it contained sixty-two drawings made by Wehdemann in 1811-12. Twenty-one drawings in the Hardwicke album are not represented in the Mendelssohn album, and twenty-eight in the latter are absent from the former, the sequence of the drawings in the two volumes being quite different.

The third album, formerly owned by Canon F. W. Galpin, and now at Kew, contains sixty drawings and descriptions, signed "C. H. Wehdemann", the descriptions being in Wehdemann's handwriting. Fourteen of the drawings in this third album are not represented in the Hardwicke album, and eight in the latter are lacking in the [now] Kew copy, the sequence being different.

The Kew copy bears the following inscription:

"During my travels in the interior of this colony, I have had occasion to explore the extensive woods and forest in the district of Plettenberg's

Bay, in order to ascertain the nature and properties of different trees, and to find out their usefulness in Arts and Commerce, by a minute examination of the nature of the bark and wood and the dimensions of the trunks of the trees.

"To enable travellers and botanists, or any other person, sent to the above-mentioned woods and forest for timber, to acquire with more facility a knowledge of trees, etc., I thought it necessary to annex the Dutch name, and that of the natives, to each species of tree or shrub known to them.

"And if the following description will be of any utility to government, with respect to Ship Building, I shall think myself fully compensated for my trouble, and for having two years of my life devoted to this investigation.

"In the perusal of this sketch the courteous reader I trust will excuse any incorrectness in the spelling or style, as the underwriter is not acquainted with the English orthography."

The following is an example of Wehdemann's text, written in a beautifully clear handwriting; this is one of his shortest descriptions to show his style :—

"Drawing No. 2

Sparmannia.

"A large shrub with straight spreading branches in its trunk about 4 inch diam.; the bark is very smooth and of a light green colour. This plant is very remarkable in respect to the underpart of its bark, which in quality is not inferior to the strongest hemp, and by which the colonists make very good fish-nets etc.; its foliage is of a pale light green colour and soft like velvet."

The Kew copy contains the following coloured drawings and descriptions; the name given by Wehdemann is shown in inverted commas and is followed by the identification, where this has been possible.

1. "Wild Pisang"—*Strelitzia augusta* Thunb.
2. "Sparmannia"—*Sparmannia africana* L. f.
3. "Bavians Taw"; "Baboon Rope"—*Secamone Thunbergii* E. Mey.
4. "Strelitzia regina"—*Strelitzia reginae* Ait.
5. "Hibiscus cannabinus"—*Hibiscus Ludwigii* Eckl. & Zeyh.
6. "Hibiscus vitifolius"—*Hibiscus* sp.
7. "Orchis-Disa maculata"—*Disa cornuta* Swartz.
8. "Malva grossulariifolia"—*Malvastrum capense* Gray & Harv.
9. "Antholyza tubiflora"—*Watsonia* sp.
10. "Moraea multiflora"—*Morea ramosissima* (L. f.) Druce.
11. "Moraea sylvestris"—*Dietes vegeta* N.E. Br.
12. "Asclepias"—*Asclepias* sp.
13. "Cafferboom"; "Caffertree"—*Erythrina caffra* Thunb.
14. "Wilde Fyge"; "Hottentots Kuman"—*Ficus capensis* Thunb. (drawing accompanying No. 3).
15. "Wilde Castanie"—*Calodendron capense* Thunb.
16. "Geele Ceur"—*Crotalaria capensis* Jacq.
17. "Hottentots Buchu"—*Empleurum serrulatum* Ait.
18. "Wilde Druive"; "Wild Grapes"—*Rhoicissus capensis* (Burm. f.) Planch.
19. "Wilde Granaat"—*Burchellia bubalina* (Linn. f.) Sims.
20. "Wolvedoorn"; "Wulfsthoorn"—*Scolopia Zeyheri* Szyszyl.
21. "Safferaan Tree"—*Elaeodendron croceum* DC.
22. "Kruisbess"; "Crosberry"—*Grewia occidentalis* L.
23. "Lederbast"; "Leather Bark"—*Euclea lanceolata* E. Mey.
24. "Kamasse"—*Gonioma Kamassii* E. Mey.
25. "Hartpeer"; "Hard-pear"—*Olinia cymosa* Thunb. var. *monstrosa*.
26. "Hottentots Bitow"—*Osteospermum moniliferum* L.
27. "Roe hout"; "red wood"—*Ochna arborea* Burch.
28. "Zwartbast"; "black bark"—*Royena lucida* L.
29. "Hottentots Nutze"—*Halleria lucida* L.
30. "Hottentots Ninkakara"—*Olinia cymosa* Thunb.

31. "Hottentots Kubuh"—*Elaeodendron sphaerophyllum* Presl.
32. "Royebast"; "red bark"—*Elaeodendron Kraussianum* Sim.
33. "Taay-bosch"; "tough bush"; "Hottentots Nanah"—*Rhus laevigata* L.
34. "Stinkwood"—*Ocotea bullata* E. Mey.
35. "Hottentots Buffeldoorn"; "Bufalothorn"—*Canthium ventosum* S. Moore.
36. "Buffelhoorn"; "Bufalo horn"—*Gardenia Rothmannia* L. f.
37. "Kraay boss"; "Crow bush"—*Royena pallens* Thunb.
38. "Eschboom"; "Ash tree"—*Ekebergia capensis* Sparrm.
39. "Scepbast"; "soap bark"—*Polygala myrtifolia* L.
40. "Polygala bracteola"—*Polygala bracteolata* L.
41. "Linde tree"—*Trimeria alnifolia* Planch.
42. "Underbosh"—*Trichocladus crinitus* Pers.
43. "Protea speciosa"—*Protea Mundii* Kl.
44. "Witte Els"; "White Ash"—*Platylophus trifolius* Don.
45. "Speekhout"; "pork wood"—*Kiggelaria africana* L.
46. "Wacht een bitje"; "stop a little"—*Scutia myrtina* (Burm.) Kurz.
47. "Melkhout"; "milkwood"—*Sideroxylon inerme* L.
48. "Hypocrite"—*Turraea obtusifolia* Hochst. (flowers in bud?).
49. "Kershout"; "cherry wood"—*Pteroclastrus tricuspidatus* Sond.
50. "Paarde Piss"; "horse urine"—*Lepris lanceolata* G. Don. (leaves should be trifoliate.)
51. "Zwart Olyve"; "black olive"—*Olea craspedata* Jacq.
52. "Solitarius"—*Pittosporum viridiflorum* Sims.
53. "Zwart Eysenhout"; "black ironwood"—*Olea laurifolia* Lam.
54. "Rood Els"; "red ash"—*Cunonia capensis* L.
55. "Penndoorn"—*Celastrus buxifolius* L.
56. "Wilde Olie"; "Palma Christi"—*Ricinus communis* L.
57. "Wilde Saly"—*Brachylaena neriifolia* R. Br.
58. "Hassagey"—*Curtisia faginea* Ait.
59. "Boeke"—*Rapanea melanophlaeos* Mez.
60. "Geelhout"; "yellow wood"—*Podocarpus elongata* L'Hérit.

Haworth, 1812.—In 1812 Haworth published in London his *Synopsis Plantarum Succulentarum*, which was offered as a complete enumeration of succulent plants so far as cultivated in the neighbourhood of London, and nearly all in his own collection at Chelsea. Many South African plants were enumerated in this book; for example, he had thirty-one species of *Stapelia*, 206 species of *Mesembryanthemum*, and sixteen species of *Pelargonium*. Haworth is described as an entomologist, and was born at Hull in 1768, dying at Chelsea in 1833. His herbarium is at Oxford University. Besides the works mentioned, he contributed to Andrews' *Botanists' Repository*.¹

S. Edwards, 1815-1847.—S. Edwards' *Botanical Register* (London, 1815-1847). A work similar to the *Botanical Magazine*, with coloured figures, including many South African plants.

J. F. Jacquin, 1816.—J. F. Jacquin, *Synopsis Stapeliarum* (Vienna, 1816). A small work of twelve pages.

Salm-Dyck, 1817.—J. Salm-Reifferscheid-Dyck, *Verzeichniss der Verschiedenen Arten und Abarten des Geschlechts Aloe*. A catalogue of the known species of *Aloe*, with short Latin descriptions and occasional notes; the Kew copy is a French edition, and is dated March 1817.

Bauer, 1818.—Francis Bauer, *Strelitzia Depicta*, or *Coloured Figures of the Known Species of the Genus Strelitzia*, from the Drawings in the Banksian Library, London, 1818. Consists of the above title-page and eleven coloured plates of species of the genus showing habit and

¹ See *Journ. Bot.*, 1916 : 241.

with floral dissection. The drawings are very good, but there is no text. Bauer was botanical painter to His Majesty, King George III.

Lehmann, 1818.—J. G. C. Lehmann, *Plantae e familia Asperifoliarum nuciferae*, Berlin, 1818, 478 pp. An account of some Boraginaceous genera, including *Lobostemon* (under *Echium*).

Loddiges, 1818–1833.—C. Loddiges, *The Botanical Cabinet* (London, 1818–1833); twenty volumes, containing 2000 coloured plates of plants cultivated at Loddiges' nursery at Hackney. Many Cape plants depicted. The notes are mainly horticultural.

Wikstroem, 1818.—J. E. Wikstroem, "Granskring af de till Thymelearum växtordning hörande släkten och arter" (*Act. Acad. Scient. Holm.*, 1818, pp. 263–354, t. 1).

Haworth, 1819.—A. H. Haworth, *Supplementum Plantarum Succulentarum* (London, 1819, pp. 158). A supplement containing the succulent plants added to the gardens of England since the publication of his previous work in 1812; many Cape succulents are described. Among the remarks in his preface regarding the source of his additions occurs the following :—

"And, as heretofore, first amongst those, and in beauty and management yielding to none, stand our Royal Gardens of Kew; . . . and the old remark respecting Africa, and which is now too trite to be repeated here, may nevertheless be well paraphrased by likening it to Kew: *Semper aliquid novum, ex regio horto Kewense.*"

Delessert, 1820–1846.—B. Delessert, *Icones selectae plantarum* (Paris, 1820–1846). A fine work in five volumes. Contains very good plates and descriptions of some Cape plants.

Link and Otto, 1820–1828.—H. F. Link and F. Otto, *Icones plantarum selectarum horti regii botanici Berolinensis* . . . (Berlin, 1820–1828). In ten parts, containing sixty plates of plants grown in the Berlin Botanic Garden, of which fourteen are from South Africa.

Richard, 1820.—A. Richard, *Monographie du genre Hydrocotyle* (UMBELLIFERAE) (Brussels, 1820), pp. 86, 18 pl. An account of the genus as then known, with good black-and-white figures; text in French and Latin.

Sweet, 1820–1830.—R. Sweet, *Geraniaceae* (London, 1820–1830). Five volumes of descriptions and coloured plates on the lines of the *Botanical Magazine*, very good pictures of the numerous species of *Pelargonium*, etc., in cultivation at that period.

Haworth, 1821.—A. H. Haworth, *Revisiones Plantarum Succulentarum* (London, 1821). Includes short descriptions of a large number of species of *Mesembryanthemum*. This is a supplement to his *Synopsis Plantarum Succulentarum* of 1812.

Herbert, 1821.—W. Herbert, *An Appendix* (to vol. vi of Edward's *Bot. Reg.*). A preliminary work on bulbous plants to his larger monograph on *Amaryllidaceae* (1837).

Lehmann, 1821.—J. G. C. Lehmann, *Icones et Descriptiones novarum et minus cognitarum stirpium* (Hamburg, 1821), pp. 28, tt. 50. Contains several very good plates and short descriptions of *Boraginaceae*, including *Lobostemon* (under *Echium*).

Reichenbach, 1822–1826.—H. G. L. Reichenbach, *Magazin der aesthetischen Botanik, oder Abbildung und Beschreibung der für Garten-*

kultur empfehlenswerthen Gewächse, etc. (Leipzig, 1822–1826). Fairly good coloured plates with dissections, including about fifty Cape plants mostly *Sterculiaceae* (*Hermannia*).

Choisy, 1823.—J. G. Choisy, *Mémoire sur la famille des Sélaginées* (Genera, 1823), pp. 44, tt. 5. An account of the family SELAGINACEAE.

Schultes' edition of Thunberg's *Flora Capensis*, 1823.—Thunberg's previous work was all reprinted in I. A. Schultes' edition in 1823, and contained in pp. 1–343 of that work, the remainder of the book from *Erica* onwards (pp. 344–803) being published for the first time. According to Schultes' preface, this remainder was printed from Thunberg's MSS. and Thunberg himself revised the edition from *Crassula* (p. 279) to the end. Thunberg died in August, 1828, at the age of eighty-five, and five years after the publication of Schultes' edition. This book is a fitting monument to Thunberg's work in South Africa, the descriptions being very full and accurate.

But the various editions of the *Flora Capensis* are not the only monuments of Thunberg's work, for he published a large number of short papers on Cape plants. A list of these papers is given by Schultes in his preface under the headings: (1) "Opuscula varia in diversis Societ. et Acad. Actis impressa", and (2) "Dissertationes" published in the *Journal of the Linnean Society of London* in 1791 and 1794. At the end of this interesting *Flora Capensis* there is an exceptionally large list of *errata* (two and a half pages).

Sweet, 1823–1829.—R. Sweet, *The British Flower Garden* (London, 1823–1829), 3 vols., with coloured plates after the manner of the *Botanical Magazine*; ser. II (London, 1831–1838), 4 vols. Contains plates of Cape plants.

Bartling, 1824–1825.—F. G. Bartling, *Beiträge zur Botanik* (Göttingen, 1824–1825). First part deals with South African *RUTACEAE*, the second, entitled *Descriptiones plantarum novarum vel minus cognitarum*, by Wendland, describes seventeen Cape plants.

Cruse, 1825.—W. Cruse, *De Rubiaceis Capensibus praecipue de genere Anthospermo* (Berlin, 1825), pp. 24, tt. 2. An account of the genera *Anthospermum*, *Ambraria*, *Galopina*; a similar account appeared in *Linnaea* 6: 1–21 (1831).

Jussieu, 1825.—A. de Jussieu, *Mémoire sur les Rutacées* (Paris, 1825), pp. 160, tt. 14–29. Includes the Cape *RUTACEAE*, very good plates of floral dissections.

Bresler, 1826.—M. Bresler, *Generis Asparagi Historia Naturalis atque Medica Dissertatio* (Berlin, 1826), pp. 46. An account of the genus *Asparagus*.

Brongniart, 1826.—A. Brongniart, *Mémoire sur la Famille des Rhamnees* (Paris, 1826), pp. 78, tt. 1–6. Deals with the few Cape species of *RHAMNACEAE*.

Brongniart, 1826.—A. Brongniart, *Mémoire sur la Famille des Bruniacées* (*Linnaea*, 8: 357–389 (1826)). An account of the family *BRUNIACEAE*.

Chamisso, 1826–1836.—A. von Chamisso, "De Plantis in Expeditione Speculatoria Romanzoffiana observatis rationem" (*Linnaea*, 1–10; Berlin, 1826–1836). An enumeration of the plants collected on the Russian exploring expedition fitted out in 1815 by Count Romanzoff; collections were made at the Cape from 31st March to 8th April, 1818.

Schlechtendahl, 1826.—D. F. L. von Schlechtendahl, *Ueber die Melanthiaceen am Vorgebirge der guten Hoffnung* (Linnaea, 1 : 78–95 (1826)). An account of the Cape members of the Liliaceous tribe MELANTHIEAE.

Schlechtendahl, 1826.—D. F. L. von Schlechtendahl, "Plantarum capensium descriptiones ex schedis derelictis Bergianis" (Linnaea, 1 : 250–258 (1826)). MS. notes of C. W. Bergius (not P. Bergius), a young Berlin man who went to Cape Town to practise medicine, but died early; he sent plants and animals to the Berlin Museum. The paper includes a coloured plate of *Cadaba juncea* Benth. (*Schepperia juncea* DC.) (CAPPARIDACEAE).

Ker, 1827.—J. B. Ker, *Iridicarum Genera* (Brussels, 1827), pp. 158. An account of the family IRIDACEAE, as known at that date.

Bauer, 1830–1838.—F. Bauer, *Illustrations of Orchidaceous Plants*, with notes and prefatory remarks by John Lindley (London, 1830–1838). Very fine coloured drawings, including some Cape species.

Bowie, 1830.—According to MacOwan and Bolus, J. Bowie published certain papers in the *South African Quarterly Journal* as follows : (1) "Sketches of the Botany of South Africa", vol. 1, 1830, pp. 27–36, a list of 209 plants generally flowering in December, January, February, and March, in the Cape District. (2) "On the Exotic Plants which have been Introduced into South Africa", vol. 1, 1830, pp. 160–171, 293–304, 408–413. (3) "On the Species of *Aloe* and *Gasteria*", vol. 1, 1830, pp. 90–91.

A. de Candolle, 1830.—Alphonse de Candolle, *Monographie des Campanulées* (Paris, 1830). Includes the South African species.

Ecklon, 1830.—C. F. Ecklon, *List of Plants found in the District of Uitenhage from July 1828 to February 1830*, together with a description of some new species.

This paper was published in the *South African Quarterly Journal* for 1830, pp. 358–379, and there is a typewritten copy at Kew. It deals with collections of plants by Ecklon from **A**, the Adow district; **B**, the hills in the vicinity of Uitenhage and between the Zwartkop and Sunday Rivers; **C**, the fields of the Zwartkops River; **D**, the banks of Zwartkops and Sunday Rivers; **E**, the sea-shore of Algoa Bay, from the mouth of Sunday's River to Cape Recife; **F**, plains under the mountains of Winterhoek, Van Staaden's River, and the hills near Port Elizabeth; **G**, mountains at Van Staaden's River, from 500 to 2500 ft.; **H**, hills and forest of Krakakamma; **I**, Zuurberg.

The systematic list of plants is arranged according to Sprengel's "General View of the Vegetable Kingdom according to the Natural Affinities", one or more of the above letters appearing after each entry indicating in which district the plants were found. A few new species were described in the paper.

Nees, 1830.—C. G. Nees ab Esenbeck, *Beitrag zur Kenntniss der Familien der Restiaceen in Rücksicht auf Gattungen und Arten*; Linnaea 1 : 627–666 (1830). An account of the South African Restiaceae; see additions 7 : 614–619 (1832).

W. J. Hooker, 1830–1848.—W. J. Hooker, *Botanical Miscellany* (London, 1830–1833) and *The Journal of Botany* (1834–1842). Contain many references to South African botany. Similarly, *The London Journal of Botany* (1844–1848). Contains many valuable accounts of Cape plants.

Lindley, 1830-1840.—J. Lindley, *The Genera and Species of Orchidaceous Plants* (London, 1830-1840), pp. 553. A compendium of the family as known at that time; descriptions in Latin, notes in English.

Carmichael, 1831.—D. Carmichael, in Hooker's *Botanical Miscellany* 2 : 1-59, 259-289 (1831); *Botany of Portions of South Africa*. Notes on botany by this author, who was a Captain in the 72nd Regiment in 1806.

Chamisso, 1831.—A. von Chamisso, "Plantae Ecklonianae", *Linnaea*, 6 : 343-351 (1831). Enumeration of some of Ecklon's plants; 8 : 52-56 (1833).

Bartling, 1832.—F. G. Bartling, "Plantae Ecklonianae", *Linnaea*, 7 : 538-541, 620-652 (1832). Deals with various small families collected by Ecklon.

Bentham, 1832-1836.—G. Bentham, *Labiatarum Genera et Species* (London, 1832-1836), pp. 783. A monumental account of the family LABIATAE, including the South African species.

Lessing, 1832.—In 1832 there appeared in Berlin a work of considerable importance to South African botany. This was C. F. Lessing's *Synopsis Generum Compositarum earumque Dispositionis Novae Tentamen Monographis Multarum Capensium Interjectis*. This gave an account of the family as known at that time, and, as the sub-title indicates, the South African representatives were accorded more full treatment than others. The book was dedicated to Alexander von Humboldt, and is something of a classic for the family COMPOSITAE.

Lessing, 1832.—C. F. Lessing, *De Generibus Cynarocephalarum atque de speciebus generis Arctotidis* (Berlin, 1832), pp. 30. Contains an account of *Arctotis*.

Meyer, 1832.—E. H. F. Meyer, "Plantae Ecklonianae, Leguminosae", *Linnaea*, 7 : 145-173 (1832). An account of Ecklon's LEGUMINOSAE.

Nees, 1832.—C. G. Nees ab Esenbeck, "Cyperaceae Capenses Ecklonianae", *Linnaea*, 7 : 491-537 (1832). An account of Ecklon's CYPERACEAE.

Schrader, 1832.—H. A. Schrader, *Analecta ad Floram Capensem*; CYPERACEAE (Gottingen, 1832), pp. 56, tt. 4.

Klotzsch, 1833.—J. F. Klotzsch, "Ericearum a cel. Adelberto de Chamisso descriptorum; pars addita" (*Linnaea*, 8 : 655-669 (1833); 9 : 350-367; 10 : 312-355; 12 : 211-247, 497-543). Latin descriptions of Cape ERICACEAE from various collectors.

Kunth, 1833-1850.—K. S. Kunth, *Enumeratio plantarum omnium hucusque cognitarum*, etc. (Stuttgart and Tubingen, 1833-1850), 5 vols. Deals with most of the then known Monocotyledons; may be used in conjunction with De Candolle's *Prodromus*, which did not include Monocotyledons, and of which the first part was published in 1824.

Nees, 1833.—C. G. Nees ab Esenbeck, "Ueber Schrader's Analecta, verglichen mit Nees von Esenbeck Erläuterungen der Capschen Cyperaceen in Herrn Ecklon's Sammlung", *Linnaea*, 8 : 75-94 (1833). Notes on Ecklon's CYPERACEAE.

D. Don, 1834.—D. Don, "An Attempt at a New Arrangement of the ERICACEAE" (*Edinb. New Phil. Journ.*, 17 : 150-160 (1834)). Genera classified with short Latin descriptions.

Lehmann, 1834.—J. G. C. Lehmann, *De Plantis Cycadeis praesertim Africae Australis* (Hamburg, 1834), pp. 14, tt. 5. Eleven species of *Encephalartos* described.

Salm-Dyck, 1834.—J. Salm-R.-Dyck, *Hortus Dyckensis* (Dusseldorf, 1834). List of species cultivated in Dyck's garden at Dusseldorf.

E. H. F. Meyer, 1835–1837.—The magnificent collection of plants made in South Africa during eight years by J. F. Drège was mainly worked out by Ernest H. F. Meyer, who gave an account of many of them in a work entitled *Commentariorum de Plantis Africae Australioris quas per octo annos collegit observationibusque manuscriptis illustravit Johannes Franciscus Drege*. Volume 1, fascicle 1, is dated 1835, and contains the PAPILIONACEAE, CAESALPINIACEAE and MIMOSACEAE. The second fascicle is dated 1837, and deals with some families of METACHLAMYDEAE (GAMOPETALAE).

Nees, 1836.—C. G. Nees ab Esenbeck, "Cyperaceae Capenses secundum novissimas Ecklonii collectiones, *Linnaea*, 10 : 129–207 (1836). Additional species of CYPERACEAE collected by Ecklon.

Presl, 1836.—K. B. Presl, *Prodromus monographiae Lobeliacearum* (Prague, 1836), pp. 52. Account of LOBELIACEAE.

Salm-Dyck, 1836–1863.—J. Salm-Dyck, *Monographia generum Aloes et Mesembrianthemi* (Bonn, 1836–1863).

Buek, 1837.—H. W. Buek, "Echia Capensia" (*Linnaea*, 11 : 129–149 (1837)). An account of the genus *Lobostemon* (text entirely in Latin).

Herbert, 1837.—W. Herbert, *Amaryllidaceae* (London, 1837), pp. 428, tt. 48, coloured. A classical account of the family as known at that time. *Herbertia*, the Journal of the Amaryllis Society of America, is founded in Herbert's honour.

W. J. Hooker and others, 1837 →.—W. J. Hooker and others, *Icones Plantarum* (London, 1837 →); figures and descriptions of new, rare and interesting species, including many South African. Still being published at Kew, edited by the Director.

de Vriese, 1837.—W. H. de Vriese, *Nova Species Cycdearum Africae Australis* (Amsterdam, 1837); from *Tydschrift voor Nat. Geschiedenis en Phys.*, 4 : 409–425, tt. 1–5.

Harvey, 1838.—W. H. Harvey, *Genera of South African Plants* (Cape Town, 1838), pp. 483. A classical work on the genera of South African plants. A posthumous second edition, edited by J. D. Hooker, was published in London in 1868.

Link, Klotzsch and Otto, 1840–1844.—H. F. Link, F. Klotzsch and F. Otto, *Icones Plantarum rariorum hort. reg. bot. Berol.* (1840–1844). Contains coloured plates of a few plants from the Cape cultivated at Berlin.

Meisner, 1840.—K. F. Meisner, "Synopsis Thymelearum, Polygonearum et Begoniarum Africae Australis" (*Linnaea*, 14 : 385–502 (1840)). Accounts of the families mentioned are given.

Schlechtendahl, 1840.—D. F. L. von Schlechtendahl, "Ueber die von Thunberg in der *Flora Capensis* aufgestellten Carices" (*Linnaea*, 14 : 350–361 (1840)). A discussion of the species of *Carex* in Schultes' edition of Thunberg's *Flora Capensis*.

Loudon, 1841.—J. W. Loudon, *The Ladies' Flower Garden of Ornamental Bulbous Plants* (London, 1841), pp. 270, tt. 58. Plates in colour, including many South African species.

Nees, 1841.—C. G. Nees ab Esenbeck, “Acanthaceae Africae Australioris ab Ecklonio collectae, adiectis nonnullis Dregeanis”, *Linnaea*, **15** : 351–376 (1841). An account of Ecklon’s and Drège’s ACANTHACEAE.

Nees, 1841.—C. G. Nees von Esenbeck, *Florae Africae australioris monographicae I. Gramineae* (Glogau (Prussia), 1841, pp. 491). The subtitle is “Glumaceae capenses”. The distribution tables at the end are the work of Drège, and refer to his *Zwei Pflanzengeographische Documente*, revised by C. T. Beilschmid, with additional localities by Ecklon. This is an account in Latin of South African grasses known at that period.

Miquel, 1842.—F. A. W. Miquel, *Monographia Cycadearum*, 1842, pp. 82, tt. 8. An account of the Cycads.

Walpers, 1842–1848.—W. G. Walpers, *Repertorium botanices Systematicae* (Leipzig, 1842–1848), 6 vols. An important general taxonomic work.

Drège, 1843.—J. F. Drège, “Zwei Pflanzengeographische Documente, nebst einer Einleitung von E. Meyer”, supplement to *Flora*, 1843 (Regensburg), pp. 230, with map of geographical areas; a classical work. Macowan and Bolus say of it: “The most valuable published record of phytogeographical facts relating to the Cape”.

Regel, 1843.—E. Regel, *Die Kultur und Aufzählung der in deutschen und englischen Gärten befindlichen Eriken* . . . (Zurich, 1843), pp. 189, tt. 3. An account in German of the species of *Erica* in cultivation at that time in Germany and Britain.

Schultz, 1843.—K. H. Schultz (= Schultz Bipontius), “Revision of COMPOSITAE”, in Walpers *Repert. Bot.*, **2** : 538–704, 944–993 (1843); **6** : 88–366 (1846–1847).

Krauss, Enumeration, 1844.—A very important contribution to the flora of South Africa appeared in the periodical entitled *Flora* in the year 1844, p. 261, and was reprinted separately in 1846. This was an enumeration of the fine collection made by Dr. Ferdinand Krauss during 1838–1840. His collections had been partly worked out and published previous to this list, by Hochstetter in *Flora*, by Meisner in Hooker’s *Journal of Botany*, by von Flotow in *Linnaea*, and Schultz Bipontius in Walpers’ *Repertorium*, and these same authors assisted in the enumeration, besides others, such as Buchinger and Bernhardt for the flowering plants.

A “Conspectus” of the families collected by Krauss is given in *Flora* for 1846, pp. 216–219. He gathered 2308 species (mostly flowering plants), of which 340 were new to science, and among them were thirty-four new genera. He collected as many as 304 COMPOSITAE, seventy-five ERICACEAE, fifty-nine SCROPHULARIACEAE, fifty-four EUPHORBIACEAE, seventy-one IRIDACEAE, seventy-six CYPERACEAE, and seventy-seven grasses.

The dates of the various parts of the *Enumeration* are as follows:—

Krauss Enumeration in *Flora* :—

1844 : pp. 261–274 (7th May); 277–307 (14th May); the Catalogue starts at p. 287, 346–359 (7th June); 423–432 (7th July); 551–556 (28th August); 667–682 (21st October); Enumeration of the COMPOSITAE by Schultz Bipontius, 692–702 (28th October); 767–783 (7th December); 819–835 (28th December).

1845 : pp. 65–80 (7th February); 81–93 (14th February); 305–314 (28th May); 337–344 (14th June); 753–764 (28th December).

1846 : pp. 113–121 (28th February); 129–138 (7th March);—Cryptogams, 209–219 (14th April).

Presl, 1844.—K. B. Presl, *Botanische Bemerkungen* (Prague, 1844), pp. 154. Descriptions and critical notes on South African plants, mainly the collections of Drège, Ecklon and Zeyher.

Burke, 1845–1846.—Burke's *Travels*; see Hook. *Lond. Journ. of Bot.*, IV, 643–653; V, 14–22, 109–134, 313–344, 430–435 (London, 1845–1846).

Sonder, 1846.—O. W. Sonder, *Revision der Heliophileen* (Hamburg, 1846), pp. 177–280, tt. 13. A revision of *Heliophila*, with a dichotomous key.

Drège, 1847.—J. F. Drège, "Standorter Verzeichniss der von C. L. Zeyher in Sud-Afrika gesammelten Pflanzen" (*Linnaeu*, 19 : 583–598), Halle, 1847. List of localities in which Zeyher collected.

Drège, 1847–1848.—J. F. Drège, "Vergleichungen der von Ecklon und Zeyher und von Drège gesammelten südafrikanischen Pflanzen mit den Exemplaren von Zeyher's neuesten Sammlungen . . ." (*Linnaeu*, 19 : 599–680; 20 : 183–258 (1847–1848)).

Pappe, 1847.—C. W. L. Pappe, *List of South African Indigenous Plants used as Remedies* . . . (Cape Town, 1847), pp. 14.

Walpers, 1848–1868.—W. G. Walpers, *Annales botanices systematicae* (Leipsig, 1848–1868), 7 vols. An important work.

Miquel, 1849.—F. A. W. Miquel, *Over de Afrikaansche Vyge boomen* (Amsterdam, 1849), pp. 40, tt. 5. An account of the African species of *Ficus*.

Roupell, 1849.—A. E. Roupell, *Specimens of the Flora of South Africa* (London, 1849); ten coloured plates. Very large and beautiful coloured drawings, with notes by Harvey.

Pappe, 1850.—C. W. L. Pappe, a medical doctor at the Cape, published in 1850 his *Florae Capensis Medicæ Prædromus*, being an enumeration of South African indigenous plants used as remedies by the colonists of the Cape of Good Hope. It is a paper of thirty-two pages. **Ed. II, 1857.**—A second edition was issued in 1857, and occupied fifty-three pages.

Pappe, 1854.—C. W. L. Pappe, M.D., in 1854 having become Colonial Botanist and Professor of Botany in the South African College, published his *Silva Capensis or a Description of South African Forest Trees and Arborescent Shrubs used for Technical and Economical Purposes*. It was a commentary on a collection of South African indigenous woods transmitted by the government to the Paris Universal Exhibition of 1855, and dealt with seventy-seven species.

Klinsmann, 1855.—E. F. Klinsmann, *Clavis Breyniana*, being a key to the works of J. Breynius (*q.v.*) [Danzig, 1855], pp. 20. The names used by this author and their modern equivalents are given in parallel columns.

de Candolle, 1856.—A. L. P. de Candolle, *Espèces Nouvelles du Genre Thesium* (from the Soc. Phys. et Hist. Nat. Geneva, 28th May, 1856, and 6th June, 1857).

Klinsmann, 1856.—E. F. Klinsmann, *Clavis Dilleniana ad hortum Elthamensem* [Danzig, 1856], pp. 31. A key to Dillenius' *Hortus Elthamensis*.

Sonder, 1857.—O. W. Sonder, "Enumeratio Santalacearum in Africa Australi Extratropica crescentium quas Dr. Ecklon et C. Zeyher collegerunt", *Flora*, 1857 (21st June), pp. 13. An enumeration of

Ecklon and Zeyher's SANTALACEAE published only three weeks after the second part of de Candolle's work quoted above.

Sonder, 1857.—O. W. Sonder, "Nachschrift zu meiner Enumeratio Santalacearum Africae Australis", *Flora*, 1857 (14th July), pp. 7.

Wyley, 1857.—A. Wyley, *Notes on the Botanical Features of Namaqualand* (Cape Town, 1857); in a report on Geology.

Chapman, 1858.—J. Chapman, *Travels in the Interior of South Africa* (London, 1858), 2 vols.; botanical appendix by J. Sanderson and E. Armitage.

Pappe, 1858.—In 1858 Pappe, in collaboration with the Hon. Rawson W. Rawson, issued an account of the ferns of the Cape entitled *Synopsis Filicum Africae Australis*. It covered fifty-seven pages of descriptive text.

W. H. Harvey, Thesaurus Capensis, 1859–1863.—This consists of illustrations of the South African flora, with brief descriptions of specimens selected from the Dublin University Herbarium, of which Harvey was Keeper. The work was admirably conceived and executed on the lines of Hooker's *Icones Plantarum* and was "designed to be a running Supplement and Illustration of the *Flora Capensis*". In it are illustrated "new, unfigured, or little known plants, or such as by their structure, use, or beauty, specially recommend themselves to notice".

Only two volumes were published, each containing 100 lithographed plates. Many striking plants were depicted, and it is much to be regretted that the work was not continued when the *Flora Capensis* was revived at Kew. It should be noted that the plants were drawn and even lithographed by Harvey himself. In those days Harvey was truly the *doyen* of South African botany, a mantle later borne by N. E. Brown at Kew.

Harvey and Sonder's Flora Capensis, 1859–1925 (1933).—In 1859 appeared the first volume of the classical work on the flora of South Africa, namely the *Flora Capensis* of W. H. Harvey of Dublin and O. W. Sonder of Hamburg. Extreme nationalism was not then the fashion, and botany, happily, knew no frontiers.

The first volume was dedicated to Sir George Grey, at that time Governor and Commander-in-Chief of the Colony of the Cape of Good Hope, and was published in Dublin. The Parliament of South Africa gave a liberal grant towards publication.

The work was prefaced by a chapter as an "introduction to botany", with a conspectus of the families so far as published, which included most of Bentham and Hooker's THALAMIFLORAE and DISCI-FLORAE.

The authors remarked that it was scarcely possible to say definitely to what number of volumes the descriptive matter would extend. They thought it would require at least five volumes of the size of the first, and that they could scarcely be completed in less than ten years. Little did they dream that the work would occupy seven volumes, several of them twice as bulky as the first, and that the final part would not be completed until 1925,¹ that is to say seventy-four years after its commencement.

¹ Actually the whole was not published until the appearance of the Supplement to Vol. V, Section 2, containing the *Gymnosperms*, in 1933.

It may provide some botanical history if I enumerate here the principal contributors to this monumental work.

Volume I by Harvey and Sonder, each author working independently; Volume II, the same, Harvey being responsible for the LEGUMINOSAE and Sonder the genus *Mesembryanthemum* and UMBELLIFERAE, which occupied most of it.

Four-fifths of Volume III was taken up by the family COMPOSITAE, the remainder being by Sonder. This volume appeared between 1864 and 1865, but unfortunately nothing further was published by these authors, for Harvey died early in 1866. His connection with the flora of South Africa had begun with his appointment as Colonial Treasurer in 1835, a post at first allotted to his brother. He spent his days at official work and his nights in botanical pursuits, and largely through overwork his health was impaired, and he returned to Dublin in 1841. In 1844 he was appointed Keeper of the Herbarium of the Dublin University, to which he presented his herbarium of nearly 10,000 species. Later he visited the United States, and then made a voyage round the world, after which he succeeded to the chair of botany in Dublin University. Though in poor health, he laboured assiduously until 1866, in the spring of which year he visited Lady Hooker, the widow of Sir William J. Hooker, in whose house at Torquay he died on 15th May, a brilliant career cut short at the early age of fifty-five years.¹

The genus *Harveya* (SCROPHULARIACEAE) commemorates his name in the annals of South African botany.

Although in the preface to the third volume there is mention of volume four as "shortly to be in preparation for the press", little was found among Harvey's papers. And his co-author, Sonder, who died in 1881, contributed nothing further to the work.

Its continuation was urged upon Kew by Sir Henry Barkly, Governor of the Cape from 1870 to 1877, and Sir Joseph D. Hooker, then Director at Kew, entrusted the task to his Assistant Director, Sir W. T. Thiselton-Dyer. Although the name of the last-mentioned appeared as editor of the remainder of the *Flora*, he wrote no part of it, his official duties at Kew being too heavy to allow him to do so.

Volume VI was the first to appear after the long interval following Harvey's death, the whole of this being the work of J. G. Baker, Keeper of the Herbarium and Library at Kew. It dealt with most of the petaloid Monocotyledons, of which he was the acknowledged authority, and though botanists nowadays may cavil at some of his work, he rendered a very great service to South African botany, for he had to deal with a very difficult and at that time comparatively little-known group. This volume appeared from 1896 to 1897.

Volume VII was the next published (1897-1900), and dealt mainly with Glumaceous Monocotyledons. N. E. Brown was responsible for the PONTEDERIACEAE, ERIOCAULACEAE, TYPHACEAE, FLAGELLARIACEAE, ARACEAE and XYRIDACEAE; C. B. Clarke the COMMELINACEAE and CYPERACEAE; J. G. Baker the JUNCACEAE; Arthur Bennett the NAIDACEAE; M. T. Masters the RESTIACEAE; whilst the difficult task of the GRAMINEAE was allotted to O. Stapf, Austrian born and naturalised,

¹ For further details see *Journ. Bot.*, 1866 : 236.

who later succeeded W. B. Hemsley as Keeper of the Herbarium and Library, and to whom I owed much for inspiration in botanical work in my own early days.

Although C. H. Wright's name appears only as the author of the PALMAE (very few in South Africa), he did a large amount of the editorial work for Sir William Thiselton-Dyer, and he was responsible for reading all the manuscript and for seeing the work through the press. Likewise N. E. Brown was responsible for the correctness of the geographical records.

The next portion of the *Flora* to be published (1901) was Part I of Volume V, occupied mainly by ACANTHACEAE by C. B. Clarke, MYOPORACEAE, SELAGINACEAE by R. A. Rolfe, and VERBENACEAE by H. H. W. Pearson, the latter at a later date becoming the first Director of the Botanic Garden at Kirstenbosch.

Volume IV, Section 2, appeared in the year 1904, and contained the HYDROPHYLLACEAE, SOLANACEAE and BORAGINACEAE by C. H. Wright; the CONVULVULACEAE by J. C. Baker and Wright; the SCROPHULARIACEAE, a large and difficult family, by W. P. Hiern; the LENTIBULARIACEAE and PEDALIACEAE by O. Stapf; the GESNERIACEAE by C. B. Clarke; the BIGNONIACEAE by T. A. Sprague.

The year 1909 saw the publication of a very big portion of the *Flora*. In this impressive volume F. Guthrie and H. Bolus elaborated the large family ERICACEAE, part of it also being done and some of it revised by N. E. Brown; PLUMBAGINACEAE by C. H. Wright; PRIMULACEAE, MYRSINACEAE, OLEACEAE and SAPOTACEAE from MS. left by Harvey; EBENACEAE by W. P. Hiern; APOCYNACEAE by O. Stapf; the large and difficult family ASCLEPIADACEAE by N. E. Brown; LOGANIACEAE by D. Prain and H. A. Cummins, and GENTIANACEAE by A. W. Hill and D. Prain.

The third section of Volume V was published in 1912 and 1913, and dealt with the large family ORCHIDACEAE by R. A. Rolfe, and the small families HYDROCHARITACEAE, BURMANNIACEAE and SCITAMINEAE by C. H. Wright, whilst the four parts of Section 2 of the same volume completed the *Flora* and appeared in 1915, 1920, and 1925. In this volume BALANOPHORACEAE and THYMELAEACEAE were elaborated by C. H. Wright, PENAEACEAE and GEISSELOMATACEAE by Miss E. L. Stephens, the LORANTHACEAE by T. A. Sprague, SANTALACEAE by A. W. Hill, the EUPHORBIACEAE by N. E. Brown, J. Hutchinson and D. Prain, ULMACEAE and URTICACEAE by N. E. Brown, MORACEAE and MYRICACEAE by J. Hutchinson and the CERATOPHYLLACEAE, BETULACEAE and SALICACEAE by S. A. Skan. Responsibility for the large and difficult family PROTEACEAE was shared by O. Stapf, E. P. Phillips, and J. Hutchinson.

Finally a small supplementary part containing the *Gymnosperms* was prepared by O. Stapf, G. Rattray and J. Hutchinson and published in 1933.

Bentham and Hooker, 1862–1883.—G. Bentham and J. D. Hooker, *Genera Plantarum* (London, 1862–1883). Classification of the families and genera of flowering plants. A classical work indispensable to all taxonomic botanists.

Pappe, ed. II, 1862.—For the purpose of the International Show in London in 1862 a second edition of Pappe's *Silva Capensis* was pre-

pared, containing much additional information obtained by Pappe in the Eastern Province and "Caffraria", including a comprehensive collection of woods. As Cape Colony was ultimately unrepresented at the Exhibition, the collection of woods was sent to the Museums of Economic Botany at the Royal Botanic Gardens, Kew.

The second edition contained descriptive notes on 102 species, and there are two appendices, one on *Myrica cordifolia* Linn., the Cape Waxberry Myrtle and other species, the other containing notes on the economic properties of thirty-one species of South African plants.

J. C. Brown, 1863-1866.—J. C. Brown, *Reports of the Colonial Botanist for 1863, 1864, 1865, 1866*. Contains a list of Cape woody trees, shrubs and fruits.

J. D. Hooker, 1863.—J. D. Hooker, "On *Welwitschia*, a new Genus of GNETACEÆ" (*Trans. Linn. Soc. Bot.*, **24** : 1-48, tt. 1-14 (1863)).

Anderson, 1864.—T. Anderson, "Enumeration of the Species of ACANTHACEÆ from Africa" (*Journ. Linn. Soc. Bot.*, **7** : 13-54 (1864)).

Schlechtendal, 1864.—D. F. L. Schlechtendal, "Beiträge zur Kenntniss der Coniferen. I. Ueber *Widdringtonia* Endl." (*Linnaea*, **33** : 339-361 (1864)). An account of the genus *Widdringtonia*.

Masters, 1865.—M. T. Masters, "Observations on the Morphology and Anatomy of . . . Restio, and Enumeration of the Species" (*Journ. Linn. Soc. Bot.*, **8** : 211-255, tt. 2 (1865)).

Baillon, 1867-1895.—H. E. Baillon, *Histoire des Plantes*; 13 vols. (Paris, 1867-1878), profusely illustrated. A monumental work on the families and genera of plants.

Böckeler, 1867-1877.—O. Böckeler, *Die Cyperaceen des Königl. Herbariums zu Berlin* (Linnaea Ser., III, vols. 1-7 (1867-1877)). Embraces the then known South African CYPERACEÆ.

Masters, 1867.—M. T. Masters, "Synopsis of the South African RESTIACEÆ" (*Journ. Linn. Soc. Bot.*, **10** : 209-279, tt. 2 (1867)).

Saunders and Baker, 1869-1878.—W. Wilson Saunders, *Refugium Botanicum*; 5 vols. (London, 1869-1878). Contains descriptions and figures of nearly 100 Cape plants; the descriptions are mainly by J. G. Baker, of the Kew Herbarium, with notes by Saunders.

Baker, 1870.—J. G. Baker, "Revision of the Genera and Species of the Herbaceous Capsular Gamophyllous LILIACEÆ" (*Journ. Linn. Soc. Bot.*, **11** : 349-436 (1870)).

Grisebach, 1872.—H. R. A. Grisebach, *Die Vegetation der Erde*; 2 vols. (Leipzig, 1872). Vol. 2 contains descriptions of the vegetation of South Africa.

Baker, 1873.—J. G. Baker, "Revision of the Genera and Species of SCILLEÆ and CHLOROGALEÆ" (*Journ. Linn. Soc. Bot.*, **13** : 209-292 (1873)).

Bentham, 1873.—G. Bentham, "Notes on the Classification, History, and Geographical Distribution of COMPOSITÆ" (*Journ. Linn. Soc. Bot.*, **13** : 335-578 (1873)).

Hiern, 1873.—W. P. Hiern, "Monograph of EBENACEÆ" (*Trans. Camb. Philosoph. Soc.*, **12**, pt. 1 : 27-300, tt. 11 (1873)). Contains thirty South African species.

Baker, 1875.—J. G. Baker, "Revision of the Genera and Species of ASPARAGACEAE" (*Journ. Linn. Soc.*, **14** : 508–632 (1875)).

Buchenau, 1875.—F. Buchenau, "Monographie der Juncaceen vorn Cap" (*Abhandl. Nat. Ver. Bremen*, **4**, pt. 4, pp. 393–512, tt. 5–11 (1875)). An account of the South African JUNCACEAE.

Meyer, 1875.—E. Meyer, *On the Geographical Distribution of Plants in South Africa*; translated with notes, by H. Bolus (Cape Town, 1875, pp. 61).

Regel, 1876.—E. Regel, *Cycadeorum generum et specierum revisio* (Petersburg, 1876), pp. 48.

Baker, 1877.—J. G. Baker, "Revision of the Genera and Species of ANATHERICEAE and ERIOSPERMAE" (*Journ. Linn. Soc.*, **15** : 253–362 (1877)).

Baker, 1877.—J. G. Baker, "Systema Iridacearum" (*Journ. Linn. Soc.*, **16** : 61–180 (1877)).

Baker, 1878.—J. G. Baker, "Synopsis of HYPOXIDACEAE" (*Journ. Linn. Soc.*, **17** : 93–126 (1878)).

Bentham, 1878.—G. Bentham, "Notes on EUPHORBIACEAE" (*Journ. Linn. Soc.*, **17** : 185–268 (1878)).

N. E. Brown, 1878.—N. E. Brown, "STAPELIEAE of Thunberg's Herbarium" (*Journ. Linn. Soc.*, **17** : 162–171 (1878)).

Rehman, 1879.—A. Rehman, *Geo-Botanische Stosunki Poludniowej Afryki* (Phytogeography of South Africa) (Krakow, 1879); pp. 69, tt. 3. For German abstract see *Bot. Centralbl.*, 1880, pp. 1119–1128.

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Bentham, 1882.—G. Bentham, "Notes on GRAMINEAE" (*Journ. Linn. Soc.*, **19** : 14–134 (1882)).

Macowan and Bolus, 1882.—Macowan and H. Bolus, "Catalogue of Printed Books and Papers Relating to South Africa" (*Trans. Phil. Soc. S. Afr.*, **2** : 101–187 (1882)).

Rolfe, 1883.—R. A. Rolfe, "On the SELAGINEAE described by Linnaeus, Bergius, Linnaeus f., and Thunberg" (*Journ. Linn. Soc.*, **20** : 338–358 (1883)).

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Marloth, 1886.—R. Marloth, "*Leucadendron argenteum* R. Br." (*Engl. Bot. Jahrb.*, **7** : 127–130 (1886)).

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Macowan, 1887.—P. Macowan, "Personalia of Botanical Collectors at the Cape" (*Trans. S. Afr. Phil. Soc.*, **4** : pp. xxx–liii (1887)).

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Baker, 1892.—J. G. Baker, *Handbook of the IRIDEAE (IRIDACEAE)* (London, 1892) ; pp. 246.

Durand and Schinz, 1892–1898.—Th. Durand and Hans Schinz, *Conspectus Florae Africae*, 1 (1895–1898) ; v (1892–1894). Deals only with Gymnosperms, Monocotyledons, and a few early families of Dicotyledons ; an unfinished work, but useful mainly for nomenclatural purposes.

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Thode, 1893.—J. Thode, "Die botanischer Hohenregionen Natalis" (*Engl. Bot. Jahrb.*, **18** : Beibl., **43** : 14–45 (1893)).

Engler, 1894.—A. Engler, "Plantae Gürichianae. Ein Beitrag zur Kenntniss der Flora von Deutschsüdwestafrika" (*Engl. Bot. Jahrb.*, **19** : 128–152 (1894)).

Sim, 1894.—T. R. Sim, *Flora of Kaffraria* (1894). At the time he wrote this little work Sim was Curator of the Botanic Garden, King William's Town, and it was first read before the King William's Town Natural History Society. It contains an interesting introductory chapter and a systematic list of species occurring in the south-eastern part of the Union.

Marloth, 1896.—R. Marloth, "Means of Distribution of Seeds in the South African Flora" (*Trans. S. Afr. Phil. Soc.*, **7** : pp. lxxiv–lxxxviii (1896)).

Pestalozzi, 1898.—A. Pestalozzi, "Die Gattung *Boscia*" (*Bull. Herb. Boiss.*, **6** : App. 3 : 1–152 (1898)).

Schlechter, 1898.—R. Schlechter, "Monographie der DISPERIDEAE" (*Bull. Herb. Boiss.*, **6** : 800–821, 846–859, 905–955 (1898)).

Wood and Evans, 1898–1912.—J. Medley Wood and M. S. Evans published the first part of *Natal Plants* in 1898, giving descriptions and lithographed plates of some of the more striking plants occurring in the province. This was the beginning of a very important contribution to our knowledge of the flora of this region of South Africa, and ran into six volumes, the last part appearing in 1912. Although the illustrations are sometimes rather crude, they are very faithful representations of the plants described, and enable one to obtain a good idea of the flora.

Sim, 1900.—T. R. Sim, "Botanical Observations on Forests of Eastern Pondoland", pp. 1–35 (*Agric. Journ. Cape of Good Hope*, 4th and 18th January (1900)).

Marloth, 1901.—R. Marloth, "Occurrence of Alpine Types in the Vegetation of the Higher Peaks of the South-Western Region of the Cape" (*Trans. S. Afr. Phil. Soc.*, **11** : 161–168 (1901)).

Schlechter, 1901.—R. Schlechter, "Monographie der *Diseae*" (*Engl. Bot. Jahrb.*, **31** : 134–313 (1901)).

Engler, 1902 →.—A. Engler, *Das Pflanzenreich* (1902 to date). The following families represented in S. Africa have been published :—APONOGETONACEAE (1906). ARACEAE (1905–1920). BORAGINACEAE (part) (1921 and 1931). CUCURBITACEAE (1916). CYCADACEAE (1932). CYPERACEAE (part) (1935–1936). DIOSCOREACEAE (1924). DROSERACEAE (1906). ERIOCAULACEAE (1903). EUPHORBIACEAE (part) (1910–1924). GERANIACEAE (1912). HALORRHAGACEAE (1905). JUNCACEAE (1906). LILIACEAE (part) (1908). LYTHRACEAE (1903). MENISPERMACEAE (1910). MYRSINACEAE (1902). OLEACEAE (part) (1920). OXALIDACEAE (1930). SAPINDACEAE (1931–1934). TAXACEAE (1903). UMBELLIFERAE (part) (1910–1927).

Bolus and Wooley-Dod, Plants of the Cape Peninsula, 1903.—In October 1903 there appeared a very important contribution to the Flora of South Africa. This was H. Bolus and A. H. Wooley-Dod's "List of the Flowering Plants and Ferns of the Cape Peninsula", which was published in the *Trans. S. Afr. Phil. Soc.*, **14**, Part 3; pp. 207–373. The authors called attention to the somewhat remarkable fact that though there was a *Flora Capensis* for the whole of South Africa, there was no catalogue of plants found on the Cape Peninsula, the portion of the colony earliest known and colonised.

Their catalogue at once remedied this defect, and is a very high-class piece of work, compiled after much labour and research, in which they were greatly helped by botanists on the staff of the Kew Herbarium, especially N. E. Brown, O. Stapf, and R. A. Rolfe, all of whom contributed largely to the pages of the *Flora Capensis* (*q.v.*).

Henslow, 1903.—G. Henslow, *South African Flowering Plants*. A book for the use of beginners, students and teachers, as stated in the sub-title. It is well illustrated and written, many South African

plants being used to show the structure of the families of flowering plants with which it deals.

Seward, 1903.—A. C. Seward, "Fossil Floras of Cape Colony" (*Ann. S. Afr. Mus.*, **4** : 1-122 (1903)).

Marloth, 1904.—R. Marloth, "Mimicry among Plants" (*Trans. S. Afr. Phil. Soc.*, **15** : 97-102 (1904)). Further observations, **16** : 165-168 (1905).

Stapf, 1904.—O. Stapf, *Die Gliederung der Graeserflora von Südafrika* (Berlin, 1904).

Berger, 1905.—A. Berger, "Über die systematische Gliederung der Gattung *Aloe*" (*Engl. Bot. Jahrb.*, **36** : 42-68 (1905)).

Juritz, 1905.—C. F. Juritz, "Notes Regarding South African Pharmacology" (*Trans. S. Afr. Phil. Soc.*, **16** : 111-134 (1905)).

Pearson, 1905.—H. H. W. Pearson, "South African VERBENACEAE" (*Trans. S. Afr. Phil. Soc.*, **15** : 175-182 (1905)).

Pearson, 1906.—H. H. W. Pearson, "Notes on South African Cycads" (*Trans. S. Afr. Phil. Soc.*, **16** : 341-354 (1906)).

Berger, 1907.—A. Berger, *Sukkulente Euphorbien* (Stuttgart, 1907).

Marloth, 1907.—R. Marloth, "Notes on the Morphology and Biology of *Hydnora africana* Thunb." (*Trans. S. Afr. Phil. Soc.*, **16** : 465-468 (1907)).

Medley Wood, 1907.—J. Medley Wood, the Director of the Natal Botanic Gardens and the Colonial Herbarium, did a great service to Natal botany when he published his *Analytical Key to the Natural Orders and Genera of Indigenous Natal Plants*, followed in 1894 by a *Preliminary Catalogue of Indigenous Natal Plants*, and finally in 1907 his *Handbook to the Flora of Natal*. The last mentioned is not a complete "Flora", but gives keys only to the families and genera, with an enumeration of the specific names.

Schönland, 1907.—S. Schönland, "List of Flowering Plants of the Districts of Albany and Bathurst" (*Records Albany Mus.*, **2** : 44-64 (1907), 97-136 (1907)).

Schönland, 1907.—S. Schönland, "Study of Some Facts and Theories Bearing upon the Question of the Origin of the Angiospermous Flora of South Africa" (*Trans. S. Afr. Phil. Soc.*, **18** : 321-367 (1907)).

T. R. Sim, 1907.—T. R. Sim's *The Forests and Forest Flora of the Colony of the Cape of Good Hope*, published by the Cape Government in 1907, is an impressive volume of 361 pages and 160 plates of line drawings by the author. This was at that time much needed, and provided the forestry department with a very useful handbook, although rather a cumbersome one. It is a monument to Sim's industry and perseverance, and must have entailed a very great amount of work. To ascertain the contents of a forest thoroughly, every constituent part must be known, and this involved botanical, cultural, sylvicultural and technical familiarity with about 500 species, many of which were at that time not known to science. The difficulties confronting Sim were therefore considerable, as they mostly are in pioneer work, and in the preparation of the work the forests themselves, with their living trees, were preferred as sources of information.

The botanical section of this book is prefaced by a synoptical key to the families and genera, and also an artificial key to the genera. The families are arranged after the system of Bentham and Hooker.

Berger, 1908.—A. Berger, *Mesembrianthemum und Portulacaceen* (Stuttgart, 1908).

Hill, 1908.—A. W. Hill, "Notes on *Sebaea* and *Exochaenium*" (*Kew Bull.*, 1908 : 317–340).

Marloth, 1908.—R. Marloth, *Das Kapland* (Jena, 1908).

Prain, 1908.—D. Prain, "Notes on *Chironia* and *Orphium*" (*Kew Bull.*, 1908 : 341–376).

Thonner, 1908, 1915.—F. Thonner, *Die Blütenpflanzen Afrikas*; pp. 672, tt. 149 with map (Berlin, 1908); English edition (London, 1915).

Wood, 1908.—J. M. Wood, "Revised List of the Flora of Natal" (*Trans. S. Afr. Phil. Soc.*, **18** : 121–280 (1908)). An enumeration of the flowering plants and vascular Cryptogams of Natal known up to that date.

Bryant, 1909.—A. T. Bryant, "Zulu Medicines and Medicine Men" (*Annals Natal Mus.*, **2** : 1 (1909)).

Burt Davy and Crawley, 1909.—J. Burt Davy and V. G. Crawley, "Families, Genera and Species of *Pteridophyta* of the Transvaal Province" (*Report S. Afr. Assoc. Advanc. of Sci.*, 1909 : 455–481).

Clarke, 1909.—C. B. Clarke, *Illustrations of CYPERACEAE* (London, 1909).

Diels, 1909.—L. Diels, "Formationen und Florenelemente im nord-westlichen Kapland" (*Engl. Bot. Jahrb.*, **44** : 91–124 (1909)).

Dinter, 1909.—K. Dinter, *Deutsch-Südwest-Afrika, Flora, Forst- und landwirtschaftliche Fragmente* (Leipzig, 1909), pp. 192. Contains, among other things (see title), botanical observations on the journey from Swakopmund to Windhoek.

Knuth, 1909.—R. Knuth, "Über Bastardbildung in der Gattung *Pelargonium*" (*Engl. Bot. Jahrb.*, **44** : 1–35 (1909)).

Macowan, 1909.—P. Macowan; "Obituary Notice" (*Report S. Afr. Assoc. Advanc. of Sci.*, 1909 : 71–79, with portrait).

Moeser, 1909.—W. Moeser, "Über die systematische Gliederung und geographische Verbreitung der Afrikanischen Arten von *Helichrysum* Adans." (*Engl. Bot. Jahrb.*, **43** : 420–460 (1909)).

Muschler, 1909.—R. Muschler, "System und Pflanzengeogr. Gliederung der Afrik. *Senecio* arten" (*Engl. Bot. Jahrb.*, **43** : 1–74 (1909)).

Sprague and Hutchinson, 1909. T. A. Sprague and J. Hutchinson, "The Triumfettas of Africa" (*Journ. Linn. Soc. Bot.*, **39** : 231–276, t. 17 (1909)).

Stapf and Hutchinson, 1909.—O. Stapf and J. Hutchinson, "*Gardenia Thunbergia* and its Allies" (*Journ. Linn. Soc. Bot.*, **38** : 417–428, t. 37 (1909)).

Knuth, 1910.—R. Knuth, "Über die geographische Verbreitung der Gattung *Pelargonium* und ihre morphologischen Verhältnisse" (*Engl. Bot. Jahrb.*, **45** : 39–51 (1910)).

Moeser, 1910.—W. Moeser, "Die Afrikanischen Arten der Gattung *Helichrysum*" (*Engl. Bot. Jahrb.*, **44** : 239–345 (1910)).

Pearson, 1911.—H. H. W. Pearson, "Collections of Dried Plants obtained in South West Africa by Percy Sladen Memorial Expeditions 1908–1911" (*Ann. S. Afr. Mus.*, **9** : 1→ (1911)).

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Schönland, 1911.—S. Schönland, "South African ANACARDIACEAE in the Herbarium of the Albany Museum" (*Records Albany Mus.*, **2** : 231–250 (1911)).

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Dinter, 1912.—K. Dinter, "Die vegetabilische Veldkost Deutsch-Südwest-Afrikas" (Okahandja, 1912), pp. 47, tt. 13. An account of the useful plants of South-west Africa, with excellent photographs.

Dümmer, 1912.—R. A. Dümmer, "Contribution to our Knowledge of the Genus *Agathosma*" (*Fedde Repert.*, **11** : 401–423 (1912)).

Dümmer, 1912.—R. A. Dümmer, "Enumeration of Bruniaceae" (*Journ. Bot.*, 1912 : Suppl. 1–37)).

Marloth, 1912.—R. Marloth, "Further Observations on the Biology of *Roridula* L." (*Trans. Roy. Soc. S. Afr.*, **2** : 59–62 (1912)).

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Phillips, 1912.—E. P. Phillips, "Notes on the Principal Systematic Work and Publications Dealing with the South African PROTEACEAE" (*Trans. Roy. Soc. S. Afr.*, **2** : 275–282 (1912)).

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Marloth, 1913–1932.—R. Marloth, *The Flora of South Africa*, 4 vols. (Cape Town and London, 1913). A monumental work initiated by Lady Phillips, and profusely illustrated by coloured plates, photographs and line drawings. Vol. 1 (1913); vol. 2 (1925); vol. 3 (1932); vol. 4 (1915).

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Chapter XXXI

NOTES ON THE HISTORY OF BOTANICAL EXPLORATION IN SOUTH AFRICA UP TO THE TIME OF HARVEY AND SONDER'S *FLORA CAPENSIS*

THE history of plant-collecting for herbaria and horticulture has kept pace with geographical discovery the world over, and is equally full of romance and adventure. The early travellers were usually keenly interested in natural history, and, in spite of many difficulties, made extensive collections on their expeditions. The great herbaria of Europe are therefore filled with the results of their labours.

Macowan said of such :—

“ It is one thing to be a botanist, a past master in the science, at the head of a botanical department in some wealthy university or well endowed museum, whose patrons are princes, and be able to command the consecutive leisure which goes to the authorship of a great descriptive flora. It is quite another thing to be a botanical collector, travelling in search of plants through outlandish countries, often in peril of life, always poor and certain to receive little recognition. Yet the number of these labourers who bear the burden and heat of the day, and bring the erudite describer his materials, is by no means small. Nor will they cease from the face of the earth so long as the love of wild nature and a certain strain of gipsyhood combine to make men unable to endure the monotony of labour which brings no ideas. . . . ”

It is entirely due to the combined labours of collectors and botanists that taxonomic botany is now in such an advanced state. Linnaeus was himself a traveller, though his journeys did not take him very far afield, and never into the warmer regions of the world. According to Sparrman,¹ Linnaeus frequently said that nothing had vexed him more in his whole life than that when he visited Holland he had not accepted the offer which had been made to him of paying a visit to the Cape of Good Hope. But several of Linnaeus' pupils travelled extensively and made large collections, among them being Forsskal, who went to Arabia and the Eastern Sudan, Osbeck to China, and Thunberg to South Africa and Japan.

In the following pages some details² of the principal botanical collectors and their journeys in South Africa have been gathered together, particularly of those previous to the publication of the first part of Harvey and Sonder's *Flora Capensis*.

The earliest collections went to Holland, where the botanical gardens at Leyden and Amsterdam were in friendly rivalry, and to these two centres were drawn the floral riches of South Africa. A wealthy Englishman, Clifford, had a splendid garden at Hartecamp, near Haarlem, and Linnaeus became botanist to Clifford, and wrote a

¹ Sparrman, *A Voyage to the Cape of Good Hope*, 1 : 81.

² For a more detailed account of some of the collectors the interested reader is referred to MacOwan's presidential address to the South African Philosophical Society for 1886 (*Trans. S. Afr. Phil. Soc.*, 4 : xxx–liii).

catalogue of his garden, the famous *Hortus Cliffortianus*, which was published in 1737.

Heurnius ante 1644.—Justus Heurnius was one of the earliest botanical collectors at the Cape. He first collected *Stapelia virgata*, on which Linnaeus founded the genus *Stapelia*, named after Stapel, who reproduced Heurnius' drawings and descriptions. Stapel's work in *Theophrastus Historia Plantarum* (1644) therefore represents the earliest account of Cape plants (see p. 555). Heurnius was a clergyman who called at the Cape on his way to the Dutch East Indies, and he sent a few plants to his brother, a professor at Leyden.

Hermann, 1672.—Paul Hermann collected at the Cape in 1672, and his plants may be seen in the historic Sloane Herbarium in the British Museum (Natural History), South Kensington, London. They are preserved in volume number 75, and occupy 66 pages, with usually three or four specimens on a page. On the whole they are very fine examples, considering they are now about 270 years old. Most of them are determined by Solander in his beautiful "copy-book" handwriting, the like of which is rarely seen nowadays. Hermann was a surgeon in the service of the Dutch East India Company, and later became professor of botany at Leyden. In 1793 Sir Joseph Banks purchased his herbarium from Petiver for £75.

Ten Rhyne, 1673.—William Ten Rhyne, a physician employed in the Dutch East India Company's service in Japan, spent a short time at the Cape in 1673, and made sketches and collections of plants around Table and Saldanha Bays. They are enumerated by Breynius (see p. 556).

Oldenland, circa 1700.—Also in the same Sloane collection are the plants gathered at the Cape by H. B. Oldenland. The title of the volume containing them is written in red pencil, and reads: "*Hortus Siccus Capensis: Plants gathered at the Cape of Good Hope by Mr. Oldenland, sent to Petiver and disposed by him.*" The tome consists of 298 large pages, on most of which are pasted specimens, and a considerable number of them are also determined by Solander.

Oldenland was a gardener in charge of the Dutch East India's Company's garden at Cape Town, a post previously held by J. Hertog. Macowan remarks (*loc. cit.*): "It is therefore almost certain that these two men were the humble ministers to the scientific zeal of the Amsterdam and Leyden professors, although most of the honour and thanks were given to Adrian van der Stell, the Governor."

Van der Stell, 1700.—In the herbarium of Franz Kiggelaer, also at the Natural History Museum, whose name is commemorated for all time by the genus *Kiggelaria*, three volumes contain Cape plants almost exclusively. Kiggelaer himself was never at the Cape of Good Hope.

One volume is of great interest to South Africans, for the title page reads as follows:—

"Fruticetum Africanum a Domine Wilhelmo Adriano Van der Stell Fortalitiis promintoris Bonae Spei Gubernatore fortissimo transmissum 1700 no. 63. n. 3 H.S. 317."

So here we have fortunately preserved at the Natural History Museum, South Kensington, a collection of plants made under the

auspices of the first Governor of the Cape of Good Hope. Most of the plants in this particular volume belong to the family ERICACEAE among them being the *types* of *Erica margaritacea* Soland., *E. brevifolia* Soland., and *E. tubercularis* Salisb., and the type of the genus *Thamnea* Soland. (*T. uniflora* Soland.).

J. A. Auge, 1747.—Johann Andreas Auge arrived at the Cape in 1747. Auge was born at Stollberg in 1711. As a gardener he was passionately fond of plants, and migrated to Holland for improvement. There he saw the specimens collected by Hermann and Oldenland, which were later sold to Sir Joseph Banks by Petiver (see p. 610), and Auge was so interested that he determined to proceed to the Cape. He obtained employment at Cape Town in the garden of the Dutch East India Company.

Caille, 1750.—The Abbé Caille voyaged to the Cape in 1750 to make observations on astronomy. He collected some specimens of plants which are in the Jussieu herbarium in the Paris Museum.

Bergius' Flora (1767) based on Auge's collections.—Auge was sent on many journeys into the interior by Governor Tulbagh, who shared his enthusiasm for natural history. His dried specimens were acquired by Bergius, and formed the basis of the latter's *Descriptiones Plantarum ex Capite Bonae Spei* (Stockholm, 1767), which was the first serious attempt at a "Flora" of the Cape (see p. 566).

Auge claims our closer attention because later he became the companion and guide of Thunberg and Masson on their collecting expeditions. He was thus indirectly connected with the Royal Garden at Kew, for Masson was sent to South Africa from Kew. In his old age Auge became blind, and lived at Swellendam. There he was visited by Lichtenstein, who informed him that Thunberg had named a genus after him. It made him very angry when for the moment his informant could not remember to what Linnean class it belonged. It was this genus *Augea* (ZYGOPHYLLACEAE) I observed to be the only living plant in the trackless wastes of drought-stricken Bushmanland, which I crossed in my tour (see p. 178), and where there had been no measurable rain for over four years.

Sparrman, 1772.—Andrew Sparrman¹ was a medical doctor, and professor of physic at Stockholm, a Fellow of the Royal Academy of Science in Sweden, and Inspector of its Cabinet of Natural History. He travelled to the Cape in 1772 in a Swedish East Indiaman, its captain being Charles Gustavus Ekeberg, after whom the genus *Ekebergia* (MELIACEAE) was named by Sparrman. Sparrman tells us in his book of travels (*Voyage to the Cape of Good Hope*, Engl. trans., 1786) that Captain Ekeberg was an ingenious man who never neglected an opportunity of promoting the interests of science, and had obtained permission from the authorities at the Cape "to send thither a natural historian". Sparrman was no stranger to Ekeberg, for he had previously sailed with him to Canton in the years 1765–6.

Linnaeus himself supported Sparrman's application to the Royal Swedish East India Company for a passage in one of their vessels, and it is pleasant to read that even in those early days the directors of the company were of the opinion that a well-regulated commerce, as

¹ This is the correct spelling of his name, and the genus named after him should be *Sparrmania*, and not *Sparrmannia* or *Sparrmannia*.

well as navigation in general, had its foundation in science, and not only consented to what he requested, but likewise, in their great kindness, exceeded his desires. They gave Sparrman a free passage in the *Castle of Stockholm*, which sailed from Göteborg on the 10th January, 1772. After a stormy beginning they crossed the line on the 4th March, nearly two months from Stockholm, and on the 12th April anchored in Table Bay.

Sparrman's treatment at a "respectable yeoman's" on his way to False Bay brought out the remark that even in those days the Africans, "ignorant of everything beyond the limits of their own habitation, universally entertain most advantageous and flattering ideas with regard to their own country". There are Africans who hold similar views even to-day.

Soon after his arrival, Sparrman met Thunberg, whom he had known in Sweden, and who had reached South Africa a few days after him. They rambled together among the herbs and flowers around Cape Town, and made large collections, with a duplicate of as many as possible for Linnaeus. Sparrman lived with the resident for some time near Constantia, at a farm called Alphen, about $1\frac{1}{2}$ miles from the southern side of Table Mountain, where he acted as tutor to the children.

Sparrman's first journey was to Paarl, which he accomplished, mostly on foot, in six days. He remained at Constantia until November. Just then the English ships *Resolution* and *Adventure*, under Captain Cook, were anchored in Table Bay with the Forsters (father and son) on board. They offered Sparrman a post as assistant naturalist, which, after much deliberation, he accepted, and on 22nd November, 1772, sailed with them from the Cape for New Zealand.

Over two years later he again reached the Cape, on 1st March, 1775, after a long voyage. On 25th July of that year he made a journey with D. F. Immelman to "Warm Bath" (now Caledon) via the Erste River to the foot of Hottentots Holland Kloof, ascended the pass (Sir Lowrys Pass), and by noon of the second day reached Palmiet River. They arrived at "Warm Bath" on the evening of the next day.

After a course of the waters, Sparrman made preparations for his further journey, and had great difficulty at the commencement in obtaining a driver for his ox-wagon. Of this he says, "Had I had it in my power, I would gladly have bartered one or two of the seven sciences for the art of driving oxen".

They crossed the Breede River by a ferry boat, and on the 2nd September arrived at Swellendam. From there he went to Mossel Bay. It may be mentioned that on his map Plettenbergs Bay is called Algoa Bay. From Mossel Bay he travelled north-east through the Outeniquas by Lange Kloof to the coast at St. Francis Bay. Thence he journeyed some distance inland to the Sunday River, which he ascended as far as Bruintjes Hoogte, and where he stayed until 21st January, 1776. He returned to the Cape by more or less the same way as far as Swellendam, where he branched off through the Little Karoo via the Kogman's Kloof and the Hex River and Roode Zand to the Cape, which he reached on 15th April.

Sparrman's account of his travels provides a most valuable con-

tribution to our knowledge of the natural history of South Africa and of the condition of the country and its inhabitants more than a century and a half ago. His herbarium is preserved at Stockholm, many of his species being quoted by the younger Linnæus in his *Supplement to the Species Plantarum* (see p. 568).

Francis Masson, 1772.—Masson, who is mentioned later on as the companion of Thunberg on two of his expeditions to the interior (pp. 568), was born at Aberdeen, whence have come so many good and keen gardeners. He migrated to Kew, where he served in the royal garden under William Aiton. At the suggestion of Sir Joseph Banks, it was decided to send a collector to the Cape, and Masson accepted the mission. He sailed early in 1772, and remained two and a half years. He made three journeys into the interior, and, largely on account of his introductions, according to Banks,

“Kew Garden has in great measure attained to the acknowledged superiority which it now holds over every similar Establishment in Europe; some of which, as Trianon, Paris, Upsala, &c., till lately vied with each other for preëminence, without admitting even a competition from any English garden.”¹

In a memorandum addressed to the King by Sir Joseph Banks, then President of the Royal Society, we read:—²

“I am confident that the famous Journey to the Levant, made by Monsr. Tournefort by the order of Lewis XIV, at an immense expense, did not produce so great an addition of Plants to the Paris Gardens as Mr. Masson's Voyage to the Cape only has done to that of Kew.”

In May 1776 Masson was again despatched from Kew, and was commissioned to visit Madeira, the Canaries, the Azores, the West Indian Islands and the Spanish Main. In the West Indies, however, there was war, and he was called upon to bear arms in the defence of Grenada, and was taken prisoner.

Masson's Second Visit, 1786.—Masson went to Portugal in 1783 to assist in arranging and naming the plants of a gentleman at Lisbon. He sent home numerous plants from various parts of Spain and Portugal, including Gibraltar. He also visited North Africa. He returned to England in 1785, at the end of which year he again set out for the Cape, which he reached on 10th January, 1786.

Masson remained at the Cape for nearly ten years, and sent home a regular supply of plants, living and dried. He again returned to England in 1795, and published a fine series of coloured plates of *Stapelieae* (ASCLEPIADACEAE), which were supposed to have been drawn by a soldier artist named D. Oldenburg.

Masson was ultimately sent to North America, arriving in New York in 1797. He collected among the Great Lakes, and died at Montreal in 1805, in his sixty-fourth year. His South African plants are at the British Museum (Natural History), South Kensington.

Thunberg, 1772.—Contemporaneous with Sparrman, as already mentioned, was another Swede, destined to become much more celebrated. This was Karl Thunberg, who was afterwards described as the “father of Cape Botany”. He was born at Jönköping, in Sweden,

¹ See Britten, *Journ. Bot.*, 1884 : 115.

² Britten, *Journ. Bot.*, 1884 : 115.

and eventually entered the university at Upsala, where Linnaeus, the "father of Botany", was rapidly replacing the cumbersome botanical names by his binomial nomenclature and creating a new interest in botany with his sexual system of classification.

As already mentioned (p. 609), several of Linnaeus' pupils became famous as explorers and collectors, and one of them was Thunberg. He was deputed to study in Holland, and whilst there made the acquaintance of the Burmann family, who were much interested in Cape plants, and whose botanical work is mentioned on p. 561. He accepted the position of assistant surgeon on board an East Indiaman bound for the Cape, where he arrived in 1772, after an eventful voyage (see p. 1).

FRONTISPIECE.

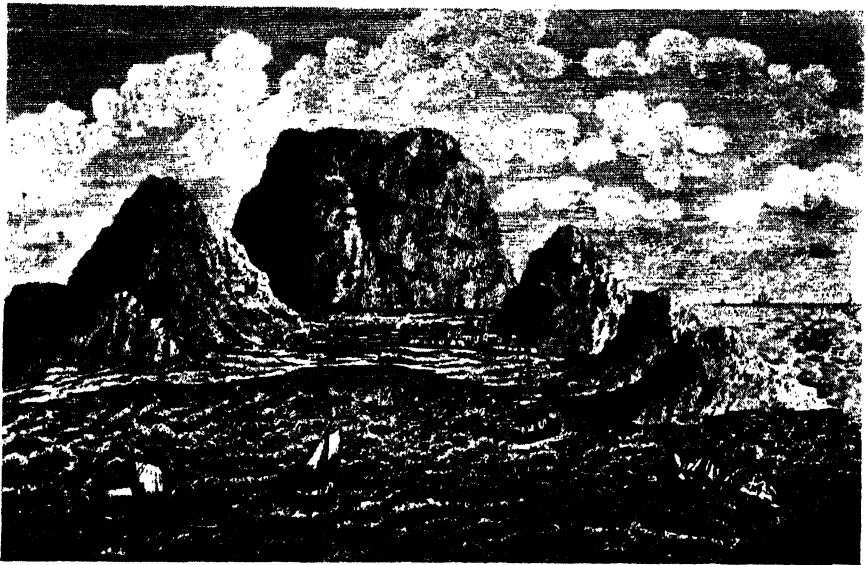


Table Bay, as shown in Thunberg's *Travels*.

For three years Thunberg travelled in South Africa, and the first botanical results of his labours were published in his work entitled *Prodromus Plantarum Capensium*, which appeared in parts from 1794 to 1800 (see p. 570). South African botanists should remember that the names published in this work pre-date those of his *Flora Capensis* ed. Schultes (1823), to which his names are often attributed in the *Index Kewensis*. Glancing over this work, it is astonishing to see the number of species of certain genera which were collected by Thunberg, and from this we may realise the great importance of the Thunberg herbarium to botanists in South Africa. In fact, a complete set of natural-size photographs of these type specimens should be in every herbarium in South Africa. For example, we note from his book that he collected as many as twenty-two species of *Satyrium* (ORCHIDACEAE), twenty-four species each of *Gladiolus* and *Ixia* (IRIDACEAE), to mention only a few monocotyledonous genera. One would have to travel far nowadays to gather the same number of species of these genera,

for many of them must now have died out on account of drought, burning, and over-stocking.

The stormy reception of Thunberg's ship at Table Bay is depicted in the frontispiece to his *Travels*, and is a somewhat weird picture of Table Bay and Cape Town as we know it to-day. In Table Bay Thunberg found, among others, a Swedish ship, which had arrived but a short time before at this southernmost point of Africa, and had brought his friend, Andrew Sparrman. He was much disappointed to find that the "respectable and universally beloved veteran, Governor Tulbagh . . . had exchanged this life for a better". He visited M. Auge, "the gardener, who has made many, those very long, excursions into the interior part of the country, and has collected all the plants and insects which the late Governor Tulbagh sent to Europe to Linnaeus, and to the Professors Burmann and Van Royen. It was of him that M. Grubb, the director of the bank in Sweden, purchased that fine collection of plants which was afterwards presented to Professor Bergius, and so well described by this latter gentleman in his book of the *Plantae Capenses*." Thunberg goes on to remark that Auge's knowledge of botany was not very considerable nor did his collections in general extend much farther than to the great and beautiful, but that they were almost solely indebted to him for all the botanical discoveries made since the days of Hermann, Oldenland, and Hartog.

As it was winter-time, Thunberg employed the intervening months in informing himself of the internal economy and institutions of the Dutch East India Company, and examined with Sparrman the plants and animals in the environs of the town and in the neighbouring mountains. In June 1772 he visited Paarl, in company with Dr. Le Sueur, a native of the Cape who had studied in Holland. Later he speaks of a visit to Paradise and Rondebosch, and remarks on the conspicuous Scots pines, *Pinus sylvestris* Linn. On 21st July, 1772, Thunberg "took a walk to Paarl and Stellenbosch".

THUNBERG'S FIRST JOURNEY, ACCOMPANIED BY AUGE.

Thunberg's First Journey, Sept. 1772-Jan. 1773.—On 7th September, accompanied by Auge, he set out on an expedition. He mentions that Auge had made as many as eighteen journeys of varying lengths into the country, and was now to be his sure and faithful guide. It was the first of three important journeys in the botanical history of South Africa, for a very great number of plants were gathered by Thunberg which were destined to become the type specimens of many South African species.

They travelled northwards from Cape Town *via* Riet Vallei, Brakfontein, Groene Kloof, as far as Saldanha Bay and the Berg River, whence they turned south-east and inland to Honigberg, Twenty Four Rivers, Hex River, and the Breede River to Swellendam. Thence they proceeded eastwards by Grootvaders Bosch, Zoutmelks River, Gouritz River, Great Brak to Kaimans Drift, and through the Langekloof as far as the Gamtoos River. They returned in December via the Langekloof, retracing their footsteps for some time, and back to Cape Town by Plattekloof, Zonder Einde River, Houwhoek, and Hottentots Holland, reaching Cape Town on 2nd January, 1773.

Later Thunberg traversed almost the same ground again with Francis Masson (see p. 617). I give below an extract from Thunberg's journal of an exciting encounter with a buffalo whilst with Auge on his first journey, which might have had a more serious ending and deprived us entirely of Thunberg's contributions to South African botany.

"At the dawn of day, on the 3rd of November, we set out again on our journey, and crossed several rivers, such as the Krakakou, Ao, Koukuma, and Neisena. The woods we passed through were narrow and full of prickly bushes. We could find no other passage through them than the tracks of the Hottentots, so that we were obliged almost to creep on all fours, and lead our horses by the bridle. Auge, the gardener, having travelled this way before, was now our guide, and we had left the Hottentots with our oxen behind us. In the afternoon we arrived at Koukuma River. We forded over one of its branches, and intended to pass through a thicket to a farm which we discovered on an eminence on the other side of this thicket, belonging to one Helgert Muller: but we had not advanced far into the wood before we had the misfortune of meeting with a large old male buffalo, which was lying down quite alone, in a spot which was free from bushes for the space of a few square yards. He no sooner discovered Auge, who went first, than roaring horribly he rushed upon him. The gardener, turning his horse short round behind a large tree, by that means got in some measure out of the buffalo's sight, which now rushed straight forwards towards the serjeant, who followed next, and gored his horse in the belly in such a terrible manner, that it fell on its back that instant, with its feet turned up in the air, and all its entrails hanging out, in which state it lived almost half an hour. The gardener and the serjeant in the meantime had climbed up into trees, where they thought themselves secure. The buffalo after this first achievement now appeared to take his course towards the side where we were approaching, and therefore could not have failed in his way to pay his compliments to me, who all the while was walking towards him, and in the narrow pass formed by the boughs and branches of the trees, and on account of the rustling noise these made against my saddle and baggage, had neither seen nor heard anything of what had passed. As in my way I frequently stopped to take up plants and put them into my handkerchief, I generally kept behind my companions, that I might not hinder their progress: so that I was now at a small distance behind them.

The serjeant had brought two horses with him for his journey. One of them had already been dispatched, and the other now stood just in the way of the buffalo, who was going out of the wood. As soon as the buffalo saw this second horse, he became more outrageous than before, and attacked it with such fury that he not only drove his horns into the horse's breast and out again through the very saddle, but also threw it to the ground with such violence that it died that very instant, and all the bones in its body were broken. Just at the moment that he was thus occupied with this latter horse, I came up to the opening, where the wood was so thick, that I had neither room to turn my horse round, nor to get on one side. I was therefore obliged to abandon him to his fate, and take refuge in a tolerably high tree, up which I climbed.

The buffalo having finished this his second exploit, suddenly turned round, and shaped his course the same way which we had intended to take. From the place I was in, and the eminence I had gained, I could plainly perceive one of the horses quite dead, the other sprawling with its feet and endeavouring to rise, which it had not strength to do, and the other two horses shivering with fear, and unable to make their escape: but I could neither see nor hear anything of my fellow-travellers and companions, which induced me to fear that they had fallen victims to the first transports of the buffalo's fury. I therefore made all possible haste to search for them, to see if I could in any way assist them; but not discovering any traces of them in the whole field of battle I began to call out

after them; when I discovered these magnanimous heroes¹ sitting fast like two cats, on the trunk of a tree, with their guns on the backs, loaded with fine shot, and unable to utter a single word."

As already stated, Thunberg returned from this trip with Auge more or less by the same route as the outward journey, and arrived at Cape Town on 2nd January, 1773. Some time was then spent in preparing his collections for despatch to Europe.

The next few months were again occupied in botanising around the Cape Peninsula and in describing his novelties. With Sonnerat, who had lately arrived from Mauritius, he visited Table Mountain in the middle of January, and we are told that Sonnerat collected as many as 300 species and wore out three pairs of shoes in the process. Thunberg tells us here that he, himself, ascended to the top of Table Mountain no less than fifteen times during three years at the Cape, and since then few botanists can have equalled this record.

Thunberg meets Masson, 1773.—Thunberg first met Francis Masson from the Royal Gardens at Kew in May 1773. He says (vol. 1, p. 265): "In the month of May, between the 13th and 19th, in company with Major Gordon and an English gardener, lately arrived, of the name of Mason (*sic*) I made an excursion on foot round the mountains situate between the Cape and False Bay." Later in the same volume (p. 316) and before starting on another expedition he says: "For my fellow-traveller I had an English gardener, of the name of Masson, who had been sent hither by the King of England to collect all sorts of African plants for the gardens at Kew. Mr. Masson arrived the year before, in the same ship² in which Captain Cook, with the brothers Forster and Sparrman,³ were to make their celebrated voyage round the world and towards the southern pole."

In December 1872 Masson himself had made a short collecting trip from Cape Town through Paarl and French Hoek as far as Swellendam (see p. 613).

THUNBERG'S SECOND JOURNEY, ACCOMPANIED BY FRANCIS MASSON.

Thunberg and Masson, Sept. 1773–Jan. 1744.—Thunberg, having now joined forces with Masson, set off on his second great journey, covering much of the same route as on his first trip with Auge. For the benefit of South African botanists, I trace in detail below the actual route of this important expedition, for with this information plants equivalent to some of Thunberg's types might be re-collected:—

Sept. 11th, 1773: Jan Basis Kraal—Rietvalley, to the right the Tiger Mountains, to the left Blue Mountains; evening at Mrs. Muller's farm. **13th:** Companys Post at Groene Kloof, having passed Dassenberg, Burger's Post and Groene Kloof Mtn.; rested a few days. **19th:** left Groene Kloof, leaving to the right Burger's Post Mountains and to the left Groene

¹ Thunberg liked to appear as a very brave man (see also p. 618) but apparently overlooked the fact that he himself had climbed a "tolerably high tree".

² This is incorrect.

³ Sparrman, however, joined Cook's ship at Cape Town (see Cook, *Voyage Round the World*, 1: 18).

Kloof Mountain, a little to the right Reebokskop, in front of that the Konterberg, behind that the Baboons Mountain; farther on Ribeek Kasteel, Four and Twenty Rivers Mountain, and Piquet Mountain; passed Papenkuyls Fountain and Uylekraal. 22nd: at Saldanha Bay. 28th: to Witteklipp. 30th: arrived at Honingklipp; passed Patrysberg, arrived at Rosendal farm.

Oct. 1st: between Saldanha and St. Helena Bays; Salt River to Matjesfontein. 3rd: Zwartland. 5th: Black Mountain. 6th: Berg River. 8th: near Dassi Klip to Karton's Kloof. 10th: crossed Oliphants River. 11th: Table Mountain, Pickeniers Kloof. 14th-15th: Elands Kloof, Koude Bokkeveld. 18th: Isaac Visage's farm. 22nd: Mosterts-hoek to Roode Zand; explored the Winterhoek Mountains, reporting great abundance of the fly-bush, *Roridula* (see p. 191); found also there *Disa caerulea*. 28th: crossed Breede River into Karoo country. 31st: Alowen Smidt's farm, opposite Hottentot's Holland.

Nov. 2nd: Gert Nels Farm near Cogmans Kloof. 3rd: Droski's farm. 4th: Jacob Bota's farm. 5th: "Rocks", near Keurboom's River; Swellendam. 10th: crossed Kerremelk's and Slange Rivers and arrived at Duyvenhoek's River. 11th: Duyvenhoek's River crossed. 12th: Clas Broyn's farm. 13th: Peter de Wett's. 15th: crossed Goud's River. 16th: Mossel Bay. 18th: Hagelkraal. 19th: Attaquas Kloof. 20th: botanised in the kloof and passed through to Kaffraan Kraal. 21st: reached Klipp River. 22nd: crossed Brack River and Matjesdrift through Matjeskloof. 23rd: Diep River. 24th: Tunis Bota's Farm. 25th: Langekloof. 26th: Peter Frere's. 30th: Essebosch.

Dec. 1st: Kromme River country, Zecko River. 9th: Road to Cabeljans River. 10th: crossed Gaintoos River, Looris River. 11th: passed Galgebosch on way to Van Stadens River. 12th: Van Stadens River. 13th: Krakakamma valley to the seashore. 15th: Zwartkops River (P. 93). Turned back by the upper road to Van Stadens River and thence to Zecko River (Dec. 20th). During Christmas holidays proceeded to Kromme River and Langekloof. 28th: Hannes Olofson's Farm to Rietvalley in Camanasseerland. 29th: near Olifant's warm-bath and Elephants River (through Karoo country). 30th: Warmbath.

Jan. 1st-14th: through Hartequas Kloof and Plattekloof, Gouds River, Rietvalley, Groot Vaders Bosch. 18th: passed through Swellendam. 19th: crossed the ferry where Breede and Zondereinde Rivers meet and to Hassequas Kloof. 20th: Tigerhoek and Zootmelks Valley. 24th: Ziekenhuys and near Zwart River. 25th: near Booter River. 26th: Groote-houthoek, Palmiet and Steenbras River, Hottentot's Holland Mountains, arriving at Cape Town on 29th Jan., 1774.

On this journey, in crossing Duyvenhoeks River, Thunberg had another most unpleasant experience which again nearly ended his life. We may read his own account as follows:—

"On the 11th of November . . . we sent down to Duyvenhoeks river, which was at a short distance from the farm. The late rains had filled this rivulet, so as to make it dangerous to cross. The rivulets of this country, however, have usually some shallow places, where, even in the greatest flood, one may cross them with waggon and oxen. To show us one of these drifts (as they are called) our hostess had been so kind as to send a slave with us; but, as he neither understood nor spoke Dutch, he was obliged to communicate his instructions to us by signs, which, either from ignorance or malice, he entirely perverted, as he pointed out to us a circular track over the river to the right, which we ought to have taken to the left. I, who was the most courageous of the company, and in the whole course of the journey, was constantly obliged to go on before and head them, now also, without a moment's hesitation, rode plump into the river, till in a moment I sank with my horse into a large and deep sea-cow hole, up to my ears. This would undoubtedly have proved my grave, if my horse had not by good luck been able to swim; and I who have always had the good fortune to possess myself in the greatest dangers, had not, with the greatest

calmness and composure, guided the animal (which floundered about violently in the water) and kept myself fast in the saddle, though continually lifted up by the stream. After having passed the hole, I was likewise successful in my attempts to get safe out of it, though the edges of these holes are in general very steep, in so much that they seldom afford one a sure footing."

Thunberg's advice on how to meet a lion is somewhat entertaining. On page 70 (*loc. cit.*) he says:—

"On meeting a lion, one ought never to run away, but stand still, pluck up courage, and look it stern in the face. If the lion lies still without wagging its tail, there is no danger, but if it makes any motion with its tail, then it is hungry and you are in great danger."

It is not on record whether Thunberg was ever able to test his theory under either of these circumstances!

On his return to the Cape late in January 1774, Thunberg was occupied in sending quantities of bulbs, seeds, and growing plants to the botanic gardens at Amsterdam, Leiden, and Leeuwarden, and insects, stuffed birds and other scarce animals to his other patrons in Europe.

Lady Ann Monson.—During the interval between his second and third journeys, Thunberg says that in his leisure hours he never neglected to visit the hills, mountains, and fields near Cape Town. He mentions particularly the arrival of Lady Ann Monson from England, a lady with a "passion for natural history". Thunberg and Masson often accompanied her on her excursions after specimens, and later Thunberg commemorated her name in the genus *Monsonia* (GERANIACEAE).

THUNBERG'S THIRD JOURNEY, ACCOMPANIED BY FRANCIS MASSON.

Thunberg's Third Journey, Sept.—Dec. 1774.—Thunberg's third and last journey in South Africa commenced on 29th September, 1774, and he was again accompanied by Masson. Beside Thunberg's story we have also that of Masson.¹

The late editor of the *Journal of Botany*, Mr. J. Britten, was keenly interested in Masson; indeed his interest amounted almost to an obsession. In his account² of Masson, however, he makes a misstatement (as a reviewer he was notoriously sharp on other people's errors!), for he remarks that Masson did not mention in the story of his third journey that he accompanied Thunberg. Masson says,³ however, "(Oct.) 2nd. To Paarle Kerk, where I was joined by Dr. Thunberg", and after that operations are always described by Masson in the plural number.

In justice to the memory of a Kew man, also, I cannot agree with Britten's statement (*loc. cit.*) that "Masson certainly leaves it to be inferred that he himself drew the figures" (of his *Stapeliae Novae*). The figures were drawn by a Dutch soldier, and although Masson in the preface to his work does not state this fact, he says, "In my

¹ *Phil. Trans. R. Soc. Lond.*, **66** : pt. 1.

² *Journal of Botany*, 1884 : 114.

³ *Phil. Trans. R. Soc. Lond.*, **66** : pt. 1, p. 302.

various journeys through the deserts I have collected about forty (STAPELIAE), and these I humbly present to the lovers of Botany. The figures were drawn in their native climate, and though they have little to boast in point of art, they possibly exhibit the natural appearance of the plants they represent, better than figures made from subjects growing in exotic houses can do." In this statement it cannot be inferred that he claimed to have painted the pictures himself.

Thunberg's third journey was also Masson's third, and was through botanically unexplored country to the north of the Cape. Thunberg had been very excited at the sight of a remarkable "fungus", *Hydnora africana*,¹ which had been brought in by a traveller from the interior. On 29th September, 1774, he left Cape Town by way of the Zout River. On 2nd October he crossed Mosselbanks River and arrived at Paarl, where he joined forces with Masson, and they collected extensively on the mountains. The most northern point reached was the Hantam Mountain near Calvinia. Near Hantam, Thunberg found the "fungus" growing under the branches of *Euphorbia tirucalli* and on its roots; the fruit was eaten by the Hottentots, foxes, etc.

They returned along the foot of the Roggeveld Mountains, and arrived at Cape Town on 29th December, 1774. No doubt on this journey the types of very many new species of plants were collected. But few of Thunberg's plants were localised, perhaps because of the paucity of geographical names in the then little-known interior.

On his return to Europe in 1779 Thunberg took up his academic duties at Upsala, and on the death of the younger Linnaeus was appointed to the chair of botany.

It was about this time that the widow of the elder Linnaeus sold the Linnean herbarium to Sir James Edward Smith, the founder of the Linnean Society of London, where the collection is still housed and well cared for.

Thunberg died on 8th August, 1828, at the advanced age of 85, and was buried at Upsala.

Paterson, 1777.—Lieutenant Paterson left Cape Town on 6th October, 1777, and proceeded with Captain Gordon along the foot of Table Mountain towards Constantia. He notes that the whole country abounded in *Protea argentea* (= *Leucadendron argenteum*), the Silver Tree, and numerous other species of *Leucadendron*, *Ericas*, and *Gnaphalium*.

Two days later they traversed the shores of False Bay, from what is now Muizenberg towards Hottentot's Holland. He notes that the Cape Flats supplied firewood for Cape Town. At night they reached the Erste River. At Hottentot's Holland he observed introduced camphor trees 40–50 ft. high and already from 12 to 13 ft. in circumference at a place formerly belonging to Governor Adrian van der Stell, after whom the town of Stellenbosch was named.

Their baggage was sent over the pass at Hottentot's Holland Kloof, whilst they themselves proceeded to explore the small bays and rocks in the mouth of False Bay, including Gordon's Bay and Paterson's Bay, named after the two travellers.

Towards evening they arrived at the Palmiet River, and next day

¹ *Hydnora africana* Thunb. in *Kongl. Vet. Akad. Handl.*, 1775 : 69, t. ii.

proceeded via Houwhoek, where they collected plants and where lions were still plentiful. In the evening they reached "Swart Berg", where there is a warm bath (probably Caledon). Thence no doubt by the route traversed by the present main road along the valley of the Zondereinde River, crossing the Breede River near its junction with the Zondereinde, and arrived at Swellendam, where they remained a few days.

On 20th October they left Swellendam and crossed the Buffal Jagt River. Collections were made in the Reed Valley. On 26th October Paterson proceeded to Groot Faders Bosch, via the Duiven Hocks River, and stayed at a farm at the foot of the Tradouw Pass, and collections were made in the surrounding country. They crossed the Lange Bergen into the Karoo, and were amazed at the change in the country, covered with Mesembryanthemum. Next they struck the Groote River, which was crossed, and then the Gamka River, which was regarded as dangerous, on account of the numerous hippopotami. Next day they reached Attaquas Kloof, and then travelled north-eastwards towards the Oliphants River. Between the Kamanassie Mountains and the Zwartberge traces of lions were seen. Owing to ill health, Paterson parted company from Gordon, resting awhile at Tsimeko, where he collected plants in the mountains.

Paterson returned by the same route, and collected a great variety of plants at Attaquas Kloof. He also collected in the woods on the Outeniqua Mountains, and then returned to Cape Town on 13th January, 1778.

Paterson set out on a second journey in May 1778. From Rondebosch he travelled past the Tygerberg to Stellenbosch. On 23rd May he was at the Erste River, and collected plants in the Stellenbosch Mountains, and on the 24th at Hottentot's Holland Kloof. He crossed the Zondereinde on 8th June, and proceeded to Swellendam. At Buffel Jagts River he speaks of making an extensive collection. From there he travelled via the Gouds River to Catharina Bay and Groen Kloof, when he turned west along the Breede River to Platte Kloof (8th July) and crossed the mountains into Channa-land, then dangerous on account of lions, which he says concealed themselves among the bushes of Royena.

Through the Verkeerde Valley at Ceres, he headed for the Cold Bokkeveld, and crossed the Doorn River. He was at Hantam, a classical hunting ground of Thunberg and Masson a few years earlier, in August 1778. There he records the danger to cattle of *Amaryllis disticha* (*Buphane disticha*), a poisonous bulb which he figures (facing p. 51), the juice of the bulb being used for poisoning arrows. On 12th August Paterson and his party descended from the Cold Bokkeveld and proceeded northwards. He collected in this region a new *Ixia* with a long spike of crimson flowers, which he considered the most beautiful he had ever found. Via the Hartebeest River he passed the base of the Khamiesberg, and after travelling to the north for a day he turned westwards (28th August, 1778) to within 30 miles of the Atlantic Ocean. North of this region he mentions the occurrence of huge Kokerbooms (*Aloe dichotoma* Linn.), 12 ft. in circumference and 20 ft. high. On 7th September he reached the Orange River and collected plants for several days in the neighbourhood.

This appears to have been Paterson's most northerly point, and thence he returned southwards by the Sand River. South of the latter he observed a great variety of "Geranium" (*Pelargonium*). On his return journey he explored the Khamiesberg and collected many species of *Morea*, *Ixia*, *Oxalis*, and *Crinum*. The route then turned again towards the Bokkeveld and the Green River, passing through Two Fountains, to the south-east of the Khamiesberg, to the Doorn and Hartebeest Rivers. From this region Paterson had intended striking south-east to "Kaffraria", but the poor condition of his oxen and wagon made this impracticable. So he again turned towards the Hantam Mountain and the Bokkeveld Mountains, where he records the discovery of the "Elephants Foot", *Testudinaria Elephantipes*, the root of which was eaten by the natives. On 6th November the Bokkeveld was left, and Paterson journeyed to Lion's Dance, going through part of the Karoo. On 7th November he was only 30 miles from the Atlantic, proceeding towards Cape Town by Heeren Lodsie-ment, south of which he met again the typical Cape flora represented by *Aspalathus* and *Leucadendron*, etc., thence via Berg Valley and the Piquetberg through Zwartland to the Cape, arriving on 20th November, 1778, after an absence of six months. It may be interesting, by way of contrast, that I covered much the same ground and much farther afield across Bushmanland in October 1928 in a little over a fortnight—with the help of a car!

Paterson made yet a third journey into the interior, starting out in December 1778 for the country known then as Caffraria. He passed through Swellendam on 3rd January, 1779, and continued by Groot Faders Bosch, Doven Hocks River, Caffer Kuils River, False River, and Gourds River, Hagal Kraal, Ataquas Kloof (12th January). In "Canna Land" he notes the cultivation of Almonds, Figs, Peaches, Apricots, etc., which were even at that early date dried and sent to Cape Town for sale. He proceeded eastwards via Lange Kloof, where he says he collected many plants and specimens. On 20th January he arrived at the Krome River and Essen Bosch, Cabeleows River, Gamtoos River (23rd January). In the woods at the last-mentioned place he records the occurrence of hordes of wild buffaloes, and of hippopotami in the Loerie River. He reached the Van Staadens River, where he found some plants of "*Aletris fragrans*" upwards of 20 ft. high. Next he encountered the Zwartkops River and the Salt Pan, the Kougha River and the Sundays River, Bushman's River, and Great Fish River. On the hills towards the Great Fish River he found a *Leucadendron*¹ and a species of Palm, *Phoenix reclinata* Jacq., up to 20 ft. high. Paterson penetrated as far to the east as the Keiskamma River, and was the first botanical collector in that region, when he returned to the Cape, arriving on 23rd March, 1779.

Not content with these three great journeys, Paterson began a fourth expedition northwards via Groene Kloof, Zwartland, and Van Riebecks Kasteel, Berg River, Piquetberg, Verloren Valley, Lange Valley, Jackals Valley, Heeren Valley, Oliphants River, and the Bokkeveld. At the Doorn River (Thorn River) the party heard lions roaring during the night. They proceeded to Brack Fontein and the Hartebeest River, where he noted several beautiful plants. By Twee Fontein and Green River he explored the slopes of the Khamiesberg;

¹ Probably *Leucospermum ellipticum* R. Br. and not a *Leucadendron*.

thence by the Koussie or Sand River, which they struck about 10 miles from the Atlantic. Observing two hills close together and similar in size and shape, Colonel Gordon, with whom Paterson was travelling called them the Two Brothers. They soon arrived at the "Great River", named by Gordon the Orange River, after the Prince of Orange. Paterson was the first to give an account of the botanical features of the Orange River; he mentions *Mimosa* (*Acacia*), *Salix*, *Rhus*, and *Ebony*; also a great variety of "Geranium" (*Monsonia*).

They left the Orange River on 29th August, but Paterson again returned to the river with his friend Hermannias Engelbright. They crossed the river farther inland than formerly, and in the region Paterson extols on the beauty of *Pachypodium namaquanus* Welw., a succulent, apocynaceous plant about 6 ft. high, and covered with long spines with a crown of crisped leaves and reddish tubular flowers. Paterson returned via the Piquetberg and Riebecks Castle, arriving at the Cape on 21st December, 1779, after a journey lasting six months and five days.

Paterson (p. 133) mentions particularly the abundance of *Acacia* ("Mimosa") in Great Namaqualand. He notes their production of quantities of gum, considered by the natives to be a peculiarly delicate species of food. Paterson concludes with short appendices on animal and vegetable poisons. Among the latter are *Boöphone disticha*, *Euphorbia virosa*, and a species of *Rhus*.

Paterson, we learn from the *Dictionary of National Biography*, was born on 17th August, 1755. He entered the army at an early age, but not before he had developed a strong liking for natural history, especially botany.

After his return to England from South Africa, Paterson was sent to India and later to Botany Bay, New South Wales, where he arrived in October 1791. Eventually he succeeded to the governorship of that colony. He was again in England in 1798, and was elected a Fellow of the Royal Society and of the Royal Asiatic Society. Afterwards he became Lieutenant-Governor of Tasmania, leaving that colony in May 1810. He died on the passage home on board the *Dromedary*, on 21st June, 1810.

Rusden's history of Australia says that Paterson "thought more of botanical collections than of extending the cords of British sovereignty". A second edition of Paterson's *South African Narrative* appeared in 1790, besides a French translation. His botanical collections made in Tasmania are in the Natural History Museum, London, but so far I have not been able to trace his South African material.

Bowie, 1816.—On 28th September, 1816, James Bowie,¹ a Kew gardener, sailed from Brazil, where he had been for two years with Alan Cunningham, on the *Mulgrave Castle*, and arrived at Table Bay on 1st November, 1816.

Until March 1818 he collected only in the vicinity of Cape Town. He left on his first collecting trip on 23rd March, 1818, exploring from Caledon via the Gouritz River, Great Brak River, George, Kayman's River, Zwart River, Goukamma, from April to June. Between July and November he was at Knysna and Plettenberg Bay, with an excursion to Avontuur (Long Kloof) from 29th September to

¹ I am much indebted for the gist of this account of Bowie to Dr. Fourcade of Witte Elsbosch.

1st October. He returned to Cape Town on 14th January, 1819, travelling back along the coast route. January to April 1819 was spent at Cape Town.

On a second journey he left Cape Town on 9th April, 1819, via the Berg River, Roodezand, Breede River, Caledon, Swellendam, Great Brak River, Knysna, and Plettenberg Bay (23rd November to 9th January, 1820), and returned to the Cape in company with George Rex, with whom he had been staying at Knysna, arriving in town on 22nd January.

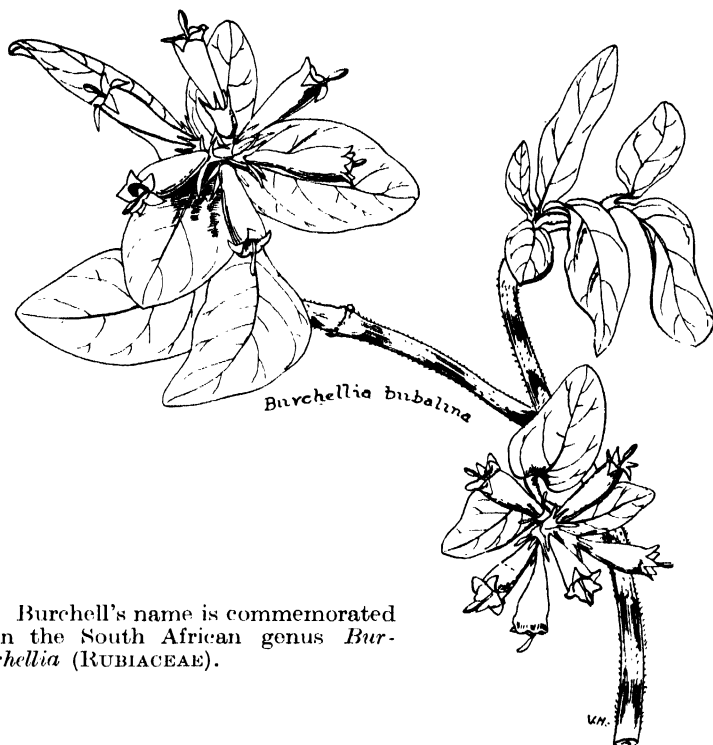
He left Cape Town for a third journey, again in company of G. Rex, was at Knysna and Plettenberg Bay from 9th March to 11th September, Goukamma (12th September), crossed to Long Kloof over the Devil's Kop (George Div.), and proceeded eastwards, crossing the Keurbooms River on 23rd September, was at Avontuur on the 26th, and made an excursion from there to the Uniondale Karoo (27th–29th September), Kromme River (9th October), Gamtoos River, Lowrie River, Uitenhage (28th October), Algoa Bay (5th November), Addo, Bushman's River, Kowie (6th December), Blaauw Krantz River, Grahamstown (8th December), returning to Algoa Bay on 21st December. He sailed from Algoa Bay on 15th January, arriving in Table Bay on the 29th, calling at Plettenberg on the way. From 30th January to 23rd May, 1821, he was at Cape Town.

On his fourth journey he shipped from Cape Town on 24th May, and arrived at Algoa Bay on 5th June, whence he proceeded to Uitenhage (14th–25th June), Sunday's River (26th), Bathurst (4th July), Great Fisch River (9th), Sunday's River (21st), Uitenhage (25th July to 18th August), Algoa Bay (19th to 29th), Graaff Reinet (14th September), Erste Poort, Colesberg Div. (30th), Sunday's River (25th October), Graaff Reinet (27th October to 29th December), Algoa Bay (30th December to 18th January, 1822), Uitenhage (19th January to 26th February, Kowie River (15th March), Uitenhage (29th), Algoa Bay (1st–9th April), Uitenhage (10th April to 6th May), returning via Vanstadens, Lowerie River, Gamtoos River, Kromme River, Avontuur (16th), Vlugt (23rd), Uplands (Knysna) (31st). From 1st June to 22nd September he again stayed at Knysna with George Rex, and returned via Goukamma (3rd–9th October), Groen Vlei, Zwart River, George (12th to 20th), Great Brak River, and Caledon and Genadendal (27th October to 27th November). He met Dr. Thom at Caledon, and arrived back at Cape Town on 4th December, 1822.

On 20th May, 1823, he sailed from Cape Town for England in the *Earl of Egremont*, calling at St. Helena, and arrived in London on 15th August.

Bowie was recalled in 1823, because the sum allowed by Parliament for botanical collectors was reduced. In 1827 he returned to the Cape to collect on his own account, but did no good, being of intemperate habits and becoming involved with bad companions. He was assisted in the latter part of his life by Arderne, the owner of a fine garden at Claremont, and died there in July 1869.

Bowie's plants are at the British Museum (Natural History), South Kensington, and at Kew, and drawings of many plants introduced by him into cultivation are in the Kew collection. The genus *Bowiea* (LILIACEAE) commemorates his name.



Burchell's name is commemorated in the South African genus *Burchellia* (RUBIACEAE).

THE TRAVELS OF WILLIAM J. BURCHELL.

Burchell as Ecologist.—Burchell must have been indeed a remarkable man. He travelled for four years in South Africa without any companions other than Hottentots. He covered about 4500 miles, journeyed through regions "never before trodden by European foot", and made extensive natural history collections, in all about 63,000 objects, including duplicates, in almost every branch of natural history. Probably no such collection gathered by one man ever left Africa before or since. In addition, he made about 500 drawings, including landscapes, portraits, costume, zoological, botanical, etc. Burchell was surely one of the first ecologists, although that term was not known to him, for he gave enumerations of the plants from various localities, "exhibiting the *geographical* or *local associations* of plants" in "the hope that they would not be unacceptable to the *philosophical* botanist".

Even to-day, in the gardens of South Africa, mostly exotic plants are cultivated, despite the wealth of beautiful species of the native flora. This fact also struck Burchell over a hundred years ago, for he remarks (p. 22):—

"It may naturally be supposed, that, in a country abounding with the most beautiful flowers and plants, the gardens of the inhabitants contain a great number of its choicest productions; but such is the perverse nature of man's judgment, that whatever is distant, scarce, and difficult to be obtained, is always preferred to that which is within his reach, and

is abundant, or may be procured with ease, however beautiful it may be. The common garden flowers of Europe are here highly valued; and those who wished to show me their taste in horticulture, felt a pride in exhibiting carnations, hollyhocks, balsamines, tulips, and hyacinths, while they viewed all the elegant productions of their hills as mere weeds."

Burchell Advocates the Establishment of a Botanic Garden.—Burchell even advocated, besides a museum, the establishment of a botanic garden. He says (p. 24) :—

"And if in the vicinity of Cape Town, a well-ordered *botanic garden*, of sufficient extent, were established, for the purpose of receiving plants which might casually, or even expressly, be collected in the more distant parts of the colony, the sum of money required for maintaining it would be but trifling, in comparison with the advantages which science, and the public botanic gardens of England would derive from it."

Little did he dream that an interval of nearly 100 years would elapse before his advice was to take effect and the establishment of the botanic garden at Kirstenbosch become an accomplished fact.

I quote another passage (p. 226) from the writings of this remarkable man, which seems to savour of "Holism" :—

"When we permit ourselves to contemplate the great designs of the creation, all our boasted knowledge of Nature appears only as the ideas and the knowledge of children. Too intent on some little parts of the edifice, we often remain totally ignorant of the proportions and perfect symmetry of the whole. In the wide system of created objects, nothing is wanting, nothing is superfluous; the smallest weed or insect is as indispensably necessary to the general good, as the largest object we behold. Each has its peculiar part to perform, conducive ultimately to the well-being of all. Nothing more bespeaks a littleness of mind, and a narrowness of ideas, than the admiring of a production of Nature, *merely* for its magnitude, or the despising of one, *merely* for its minuteness: nothing more erroneous than to regard as useless, all that does not visibly tend to the benefit of *man*."

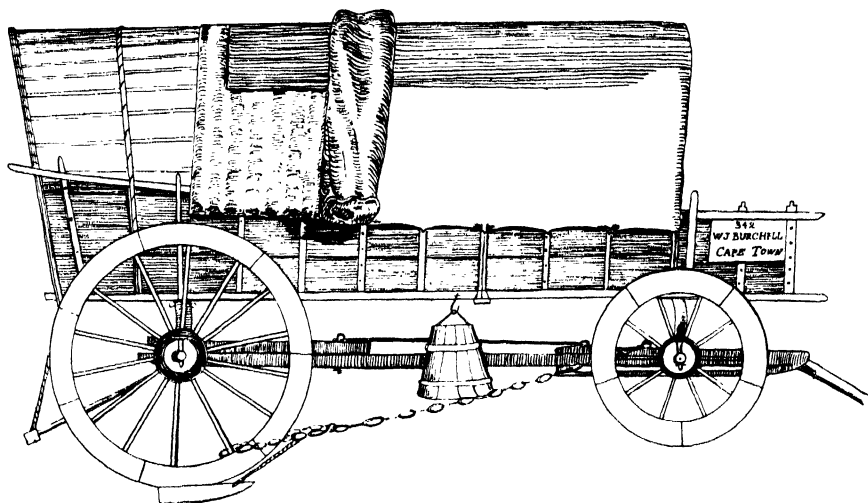
Like Thunberg's companion Sonnerat, who wore out three pairs of boots on a single ascent of Table Mountain, Burchell also on one occasion would have had to descend shoeless had not one of his fellow-climbers provided him with "spares".

It was Burchell's plan to take a direction towards the western tropics, and from there to hire a vessel to carry him to St. Helena. As we shall see, his travels took him in a very different direction.

Burchell used an ox wagon for travelling and collecting. I give a copy of his sketch of this vehicle as depicted in his *Travels* (see p. 627). In size it was about the length of a modern four-seater car, but with a body only 2 ft. 9 in. wide, the wheel track being 5 ft., and it cost Burchell eighty-eight pounds sterling, exclusive of the chests and various fittings within. He gives a list of the things which he took with him. These almost completely filled the wagon, which was heavily overloaded. The total cost of the wagon and contents was six hundred pounds sterling (Burchell, p. 169), a very large sum in those days. His list of books is interesting. He had Linnaeus, *Systema Naturae* (ed. Gmelin); Linnaeus, *Species Plantarum* (ed. Usteri), and Forster, *Enchiridion Historiæ Naturali inserviens*. Burchell appointed agents in Cape Town to receive and forward to England packages and collections which he sent back while still within reach of the town.

Botanising one day (January) about Salt River, he speaks of a heath of pure loose white sand completely covered with *Haemanthus coccineus* in full bloom. He deplored the fact that after denuding the flats of all the bushes for firewood, the poorer inhabitants of the town also dug up the underground roots, thus reducing the district to a sandy desert. He advocated the growing of shrubs and trees, with sedge and sand-grasses to protect the soil from strong winds.

It was on this excursion that Burchell noticed the dioecism of certain species which had up to then been included in *Protea*, almost at the same time as they were separated from that genus in 1810 as *Leucadendron*. He also took note of the "Kúkumakráńki plant", *Gethyllis ciliaris*, common on the Cape Flats, and a fruit much sought after by children in the month of June.



Burchell was an internationalist in his outlook. After saying how much pleasure it gave him to meet one of his own countrymen in a strange country (p. 60) and to hear his own language, he goes on (p. 60): "Such occurrences have often made the word *English* sound more delightful to my ear, but have never been, however, able to make me forget *that the good and worthy of every nation on the earth, are equally our countrymen in a philanthropic sense, and equally claim our hospitality and friendship*"; Burchell was thus an early *League of Nations* man!

Burchell remarked on the very circumscribed area occupied by the Silver tree, *Leucadendron argenteum* (p. 61). He botanised at Kirstenbosch, and describes (p. 68) the view from there as the most picturesque of any he had seen in the vicinity of Cape Town. "The beauties here displayed to the eye could scarcely be represented by the most skilful pencil; for this landscape possessed a character that would require the combined talents of a Claude and a Both."

Early in April 1811 Burchell made an excursion to Hottentot's Holland and Hottentot's Holland Kloof (now Sir Lowrys Pass). He speaks of the difficult climb over the final part at the top. This old road may still be traced, and the marks of the wagons on the stones

are visible to this day. He speaks feelingly of the poor animals which had to drag heavy loads over the steep places. "Nor will he [the observer]," he remarks, "without a compassionate feeling for the oxen, witness their toil and labour, carried to the very utmost of their strength; sometimes encouraged by good words, at other times terrified into exertion by the blows of the shambok, the loud crack of the whip, the smart of its lash, or the whoop and noisy clamour of the boor and his Hottentots."

On the other hand, one may turn from this harrowing picture and enjoy the magnificent view to the south-west, the wide expanse of False Bay bordered on the horizon by the mountains of the Cape Peninsula towards Cape Point and across the Cape Flats, with Table Mountain towering in the distance.

Burchell proceeded by the Palmiet River, discussing the cause of the brown water so characteristic of the rivers in this region, especially in the neighbourhood of George. He also remarked on the choking up of the rivers by the *Palmiet*, *Prionium serratum* Drège (CYPERACEAE). His route took him through Houw Hoek, a classical botanical locality, and he remarks on the "execrable road" through that district, a condition now happily remedied. Farther on he crossed the Bot River, and makes special mention of the pretty little trees of *Rhus villosum* adorning the landscape. Burchell arrived shortly afterwards at "a spot which had just been fixed upon by the Cape Government for the site of a village, since named *Caledon*, in honour of the Governor under whom it was founded". From there he proceeded to the Baths, where is now the palatial Caledon Baths Hotel, a fulfilment of Burchell's prophecy that the spot would "become a place of considerable resort".

From Caledon, Burchell returned via Genadendal, noting, by the way, the great quantity of *Rhenoster Bosch* on the hills. Beyond there they called at a farm belonging to a man named Duplessis, who received them very hospitably. Burchell tells an amusing tale whereby, out of politeness, he and his companion drank half a glass of vinegar which their host had poured out in mistake for his "best wine of the colony".

Importance of Wood Structure in Classification.—Burchell was a man of great perspicacity and observation. In describing the uses and beauty of the wood of the *Wagenboom*, *Protea grandiflora*, he notes its pretty reticulated grain, saying that it resembled "some of the cabinet woods brought from New South Wales, which in fact are of trees belonging to the same natural order: thus giving to botanists an additional hint that characters may possibly be discovered in the structure of the wood of plants that may throw some wished for light on a natural classification of vegetables".

They forded the Breede River towards Brandvlei, and the same evening arrived at Tulbagh. From there an excursion was made on horseback to the Witzenberg, east of the town. On the rocky summit of the Witzenberg, Burchell found a great variety of plants, especially noting the beautiful nodding red flower-heads of *Protea nana*.

He returned via Roodesand Kloof and the Berg River to Paarl, where he saw for the first time a specimen of the Rood Elze or Red Alder, *Cunonia capensis*, which he remarked as having the habit

(appearance) rather of a tropical than a Cape plant (see figure, p. 212). He passed through Bankhoek Pass, the beauty of which he extols, to Stellenbosch.

From Stellenbosch he returned to Cape Town over the Cape Flats in very inclement weather. As an example of the discomforts sometimes encountered in those early days we may quote Burchell himself (p. 146) :—

“At two o'clock in the afternoon, we left Stellenbosch to return to Cape Town, and were again unfortunate in the day, which, soon after our departure, set in with rain and wind; and, to increase our misfortunes, one of the horses fell lame, while the other stumbled at every step. It was evidently time that our excursion ended; for this last day's journey being, for nearly the whole way, over the heavy loose sand of the Cape Flats, was excessively fatiguing and painful to the animals.



Burchell crossing the Karoo.

“At sunset, we passed the foot of the Tygerberg, and were soon afterwards overtaken by a night of impenetrable darkness, and both wet and chilly. To the fear of losing the way, was added that of finding the sands impassably flooded by the late rains, as, at almost every five minutes, we had to wade through ponds of rain-water.

“In the midst of our uncertainty, wandering in various directions, a glimmering light at last appeared at a distance, and enabled us to shape our course to Saltriver. Here we procured a guide to conduct us safely through the river, which occupied ten minutes in wading through, as it had overflowed its banks and inundated a great part of the adjoining flats; and nearly all the way to Capetown, we seemed to be travelling in a river rather than a road. So complete was the darkness, that when we arrived at the hospital, it was not possible to find our way, even the short distance to the castle, without a guide: the atmosphere seemed as if bereft of every particle of light. At length, at eight o'clock, we reached Cape Town.”

Burchell now began preparations for his journey into the interior, and left Cape Town on 19th June, 1811, via Tygerberg, Grooteberg River, Roodesand Kloof (= New Kloof), and Tulbagh (27th June),

Hex River Kloof, to Karoo Poort. At Karoo Poort, Burchell collected many species he had not previously seen. From there he travelled across the Karoo, and soon noted a small shrub the flowers of which were used by the Hottentots as a dye for giving a yellow colour to native leather.

Of succulents Burchell remarks (p. 212):—

“An object very desirable for botany, would be obtained, if a good draughtsman were to pass three or four years in travelling about the Cape colony, with the sole view of drawing, on their native spot, all those plants . . . which, from their fleshy nature or delicate substance, cannot well be preserved in an herbarium.”

In those days the conditions of life on the Karoo were rather crude. Here is Burchell's description of a Veldcornet's residence (p. 237):—

“A miserable abode . . . a small oblong low hut built of rough bits of rock; rudely thatched with reed and sedge; having no window, excepting one small opening covered with white linen, instead of glass; and the doorway but half closed with a clumsy panel of reeds. The inside corresponded with the exterior, and was divided into two apartments, serving for sitting-room and bed-room, which last was also the store-room. No other furniture was to be seen, than a table and three chairs, or rather stools.”

It is at this part of his travels towards the Roggeveld Mountains that Burchell records the loss of 585 specimens (p. 250) which he had forwarded to Cape Town. On 6th August he commenced the ascent to the Roggeveld, and on p. 255 records the finding of *Acaena latebrosa* and *Alyssum glomeratum* DC. by the side of a patch of unmelted snow. The present writer found the same *Acaena* very near here (see pp. 139, 141).

In the neighbourhood of the Karreebergen, Burchell collected “one of the most beautiful little shrubs of the Bushman country”, a *Mahernia*, *M. oxalidiflora* Burchell (Burchell No. 1536), not more than a foot high, covered with large scarlet bell-shaped flowers, elegantly turned downwards; “the emblem of modesty united to beauty”.

The plain to the north of the Karreebergen abounded in bushes of the curious Bignoniaceous shrub, *Rhigozum trichotomum* (see photograph, p. 175). A real danger in this region is described very vividly by Burchell. Of this he says:—

“The largest shrubs were about five feet high, a plant quite new to me, but well known to the Klaarwater people, by the name of Haakedoorn (Hookthorn). . . . I was preparing to cut some specimens of it; which the Hottentots observing, warned me to be very careful in doing so, otherwise I should certainly be caught fast in its branches. In consequence of this advice, I proceeded with the utmost caution, but, with all my care, a small twig caught hold of one sleeve. While thinking to disengage it quietly with the other hand, both arms were seized by these rapacious thorns and the more I tried to extricate myself the more entangled I became; till at last it seized hold of the hat also; and convinced me that there was no possibility for me to free myself, but by main force, and at the expense of tearing all my clothes. I therefore called out for help, and two of my men came and released me by cutting off the branches by which I was held. In revenge for this ill-treatment, I determined to give the tree a name which should serve to caution future travellers against allowing themselves to venture within its clutches.”

So this became *Acacia detinens* Burchell!

Burchell's description of the Orange River, which he reached in what is now the Prieska Division, is well worth reading. Occupying the lower rank near the water's edge were *Wilgam-booms*, willows about 50 ft. high, *Salix gariepina*, above the *Zwartebast*, *Royena decidua*, and the *Karrehaut* and *Buffedoor*n, *Zizyphus bubalinus* and at the top the *Doornboom*. Here, along the banks of the Orange River, Burchell also found the only South African Poppy, *Papaver aculeatum* (see figure, p. 205). He also collected a beautiful *Loranthus* growing on an *Acacia*, and "a large shrub covered with a cotton-like seed was met with for the first time, and occurred in great abundance, *Tarchonanthus camphoratus* L., so common farther north on the Kaap Plateau" (see p. 428).

Burchell found the Orange (Gariëp) River to be a barrier to both fauna and flora, marking the southernmost range of some and the northernmost of others, using the apt terms *cisgariepine* and *transgariepine* respectively.

From the Orange River, Burchell travelled to the Asbestos Mountains, and on to Griquatown (Klaarwater), which he reached on 30th September, 1811. Here he stayed for some time, and made excursions to explore higher up the river and its tributaries. On one of these he collected the fruit called *Guarri* by the Hottentots, *Euclea ovata*, one of the few transgariepine shrubs with an edible fruit. A new species was brought to Burchell by one of the Hottentot women who had observed his penchant for flowers. This was named by Burchell *Buchnera aurantiaca*, and is now called *Sutera aurantiaca* Hiern, and is widely spread.

On the banks of the river grew handsome trees 40 ft. high of *Terminalia erythrophylla* Burchell, the *Roodeblat* (red-leaf), because of the beautiful autumn colour of the leaves.

Burchell made excursions over the Kaap Plateau, remarking on the innumerable anthills of large dimensions, the *Tarchonanthus* (*T. camphoratus* L.), and *Rhigozum trichotomum*. He stayed at Griquatown (Klaarwater) until visiting Wittewater in the Asbestos Mountains on 14th February, giving an interesting account of the flora (pp. 538-549).

Appended to Burchell's first volume are a map of his route, some geographical observations, and hints on emigration to the Cape of Good Hope.

The beginning of Burchell's second volume of travels deals with his return from Griquatown (Klaarwater) via the Asbestos Mountains to Graaf Reinet. He speaks of a narrow valley in the mountains with a thick and verdant carpet of a beautiful grass, *Cynodon Dactylon* Pers., often shaded by the soft foliage of large trees of *Acacia*, whose branches were festooned with *Clematis* "hanging wild with all the grace and charms of nature, and decorating them with a profusion of white flowers, which diffused their delicate and grateful odor through the airy grove".

South of the Orange River, Burchell mentions as occurring on the plains a number of scattered trees distinguished by the colour of their trunks, which appeared as if they had been whitewashed, the Wit-gat boom, *Boscia albitrunca* (Burch.) Gilg & Bened. (CAPPARIDACEAE).

On his journey to Graaff Reinet he appears to have collected no plants, his No. 2114 being from Griquatown, and his No. 2115 from Graaff Reinet.

At the Groote Tafelberg, near Middeburg, a mountain about 1800 ft. above the plain, and which I myself explored, Burchell had a reception very different from mine at the adjacent farm (see p. 435). Burchell's sketch of this striking flat-topped mountain is just as I saw it.

Burchell arrived at Graaff Reinet on 25th March, 1812. At that time the mountains surrounding the village were verdant with an abundance of the Spek-boom, *Portulacaria Afra*, but now usurped by the Prickly Pear, and the traveller here first met with the Hottentot's Brood plant, *Testudinaria elephantipes*.

Burchell left Graaff Reinet, where he had engaged some Hottentots, on 28th April, 1812, and returned to Griquatown (Klaarwater), encountering lions on the way (p. 191).

On 6th June, 1812, Burchell left Klaarwater for his journey northwards across the Kaap Plateau finding a remarkable plant which he mistook for an *Acacia*, and called *A. elephantina*, later described by Bentham as *Elephantorrhiza Burchellii*, but which should now be called *E. elephantina*; its roots are a favourite food of the elephants.

Farther north he collected a genuine species of *Acacia*, *A. stolonifera* Burch., called "Siki" by the Bechuanas, with an underground stem from which arise a multitude of shoots only 2-3 ft. high.

On 18th June Burchell halted for the night at Blinkklip Kop, of which he gives an interesting description and vignette. I have included a copy of Burchell's drawing and of my own photograph when I visited the spot with Mr. Tapscott (see p. 427), and it will be noticed that the two pictures are very much alike. At the foot of the larger mass is a deep dark cave now known as "Burchell's Cave", which natives from all parts formerly visited to obtain a supply of the powdery iron ore for smearing on their bodies. Burchell used the "sibilo", as it was called, in painting, particularly in pictures of the natives, as he found it gave the exact colour and peculiar glitter impossible to imitate by other means. The rock is known as the *Blink-klip Breccia*.¹

Here Burchell mentions meeting with a shrub regarded by the Bachapins as being bewitched or unlucky, *Vangueria infausta* Burchell. The fruit is edible and the root used in medicine.² Burchell was induced in considering this plant to remark on the affinity of the general botany of these regions with that of the island of Madagascar, comparing also the *Strelitzia augustia* of the Cape with the Traveller's Tree, *Ravenala madagascariensis*, and he has further notes on this subject (p. 263).

Much of the remainder of Burchell's second volume of travels is devoted to the natives of the Litakun (Takun) region, and we have no account of his further journey other than a list of the localities which he visited. He returned south via the Griqualand West, Hope-town, Philipstown, Colesberg Divisions, south-east to Bathurst, when

¹ See Du Toit, *Geology of South Africa*, 106 (1926).

² Watt and Breyer-Brandwijk, *Med. & Pois. Pl. S. Afr.*, 175 (1932).

he travelled back by the coast route, reaching Cape Town in July 1815, after an absence of four years—a remarkable and memorable expedition.

Burchell died in 1863, and left his collections to his sister, from whom Kew acquired them in 1865. I give a detailed list of his localities, for the benefit of South African botanists. This was compiled by the late Dr. N. E. Brown for use in the *Flora Capensis*. A similar list has quite recently been published in the South African Journal of Botany (see p. 607).

List of Localities collected at by Burchell.

CAPE DIVISION.

1-105, between Cape Town and Table Mt. on the plain, 5 Dec., 1810. 106-148, E. side of the Lion's Rump, 6 Dec. 149-225, Cape Flats nr. Rondebosch, 14 Dec. 226-290, kloof between Lion's Head and Table Mt., 21 Dec. 291-294, S. point of Lion Mt., Dec. 295-403, Camps Bay, 27 Dec. 404-506/2, vicinity of Cape Town (excursion from Cape Town to Newlands and Paradise), 3 Jan., 1811. 507-516, about the Windmills at Salt R., 14 Jan. 517-664, on Table Mt., 24 Jan. 665-694, about the Ponds and at Salt R., 31 Jan. 695-708, Cape Flats nr. Salt R. a little S.E. of the Windmills, 31 Jan. 1709-741, Cape flats nr. Rondebosch, 31 Jan. 742-755, mostly from Gardens at Cape Town. 756-757, Rondebosch, 14 Feb. 758-775, between Rondebosch and Wynberg, 14 Feb. 776-819, between Wynberg and Constantia, 14 Feb. 820-834, Cape flats nr. Rondebosch, 14 Feb. 835-837/2, under the Lion's Head Mt. on the side towards the sea. 838-840, about Cape Town, 28 Feb. 841-857, Camps Bay, 6 March. 858, Table Mt. 859-888, at Wynberg, 14 March. 889-892, Cape Town. 893-895, Camps Bay, 27 March. 896-899, between Cape Town and Salt R. 900-926, between Cape Town and Table Mt., 6 April.

CALEDON DIVISION.

927, Zwartberg Hot-baths, nr. Caledon, April, 1811. 928-930, at Bot R., April. 931-932, Zwartberg Hot-baths, nr. Caledon, April. 933, Bot R., April. 934-935, Boontjes Kraal, nr. Caledon, April. 936, Zwartberg Hot-baths, nr. Caledon, April. 937, Bot R., April. 938-939, between Cape Town and Genadendal, locality uncertain, April. 940, Bot R., April. 941, Hottentots Holland Kloof, April (Sir Lowrys Pass). 942, Donkerhoek Mt., April. 943-945, Bot R., April.

TULBAGH DIVISION.

946-948, Witzenberg, nr. Tulbagh, 17 April, 1811.

PAARL.

949-961, nr. Paarl, April, 1811.

STELLENBOSCH.

962-964, flats under Stellenbosch Kloof, April, 1811.

CAPE.

965-967, Cape Flats between Sand Valley and Tygerberg, 20 June, 1811. 968-973, nr. Tygerberg (about Pampoen Kraal), 21 June.

PAARL.

974-981, between Mosselbanks R. and Berg R., 22 June, 1811. 982, between Berg R. and Kasteels Kloof, 24 June.

TULBAGH.

983-987, between Kasteels Kloof and New Kloof (Roodezand Kloof, Burchell), 25 June, 1811. 988-1023, New Kloof, nr. Tulbagh (Roodezand Kloof, Burchell), 26 June. 1024-1025, Tulbagh, 27-30 June. 1026-1045/2, between Tulbagh and "The Drosty", 1 July. 1045/3, from a garden at Winterhoek.

WORCESTER.

1046-1058, about the Breede R., 4 July, 1811. 1059-1083, at Hex R., Kloof, 5 July. 1084-1115, between Buffels Kraal and De Straat, 6 July.

CERES.

1116-1164, between Verkeerde Vlei and Karoo Poort, 9 July, 1811. 1165-1203, W. entrance to Karoo Poort, 14 July. 1204-1216/2, between Little Doorn R. and Great Doorn R., 15 July. 1217-1219, Hangklip (Bokkeveld Karoo, nr. Ongeluks R.), 17 July. 1220-1230, Ongeluks R., 18 July. 1231-1280, nr. Yuk R., 19 July. 1281-1288/2, on the "Wind Heuvel", Koedoes Mts., 22 July.

SUTHERLAND.

1289-1301, Klein Roggeveld (at Gerrit Symman's), 26 July, 1811. **1302-1316/2**, Roggeveld Mt., 6 Aug. **1317-1329**, in the Roggeveld nr. Jakhals Fontein, S. of Sutherland, 7 Aug. **1330-1344/4**, nr. Sutherland (between Jakhals Fontein and Kuilenberg), 8 Aug. **1345-1364**, between Kuilenberg and Great Riet R., 9 Aug. **1365-1385**, at the Great Riet R., 10 Aug. **1386-1387**, Great Riet R. Kloof, 11 Aug.

FRASERBURG.

1388-1394, between Great Riet R. and Stink Fontein, 14 Aug., 1811. **1395-1398**, Stink Fontein, Aug. **1399-1402/3**, between Stink Fontein and Seldery Fontein (perhaps Celery Fontein of Map), 15 Aug. **1403-1431**, between Karree R. and Klein Quaggas Fontein, nr. Fraserburg, 24-26 Aug. **1432-1460**, between Klein Quaggas Fontein and Dwaal R., 28 Aug. **1461-1481**, at Dwaal R., 29 Aug. **1482-1490**, on Rocky Hill at Dwaal R. Poort, 30 Aug. **1491-1493**, Zak R., 31 Aug. **1494-1509**, between Zak R. and Kopjes Fontein, 4 Sept. **1510-1515**, at Zak R., 31 Aug. **1516-1521**, between "Patrys Fontein" and Great Brak R., 6 Sept.

CARNARVON.

1522-1525, Leeuwe Fontein, 8 Sept., 1811. **1526-1535**, at Klip Fontein (probably Klipaats Fontein nr. Carnarvon), 9 Sept. **1536-1545**, nr. Carnarvon ("between Klip Fontein and Schiet Fontein"), 9 Sept. **1546-1554**, Carnarvon (Schiet Fontein), 10 Sept. **1555-1578**, N. end of the Karree Bergen Poort nr. Carnarvon, 10 Sept. **1579-1583**, between Carnarvon (Schiet Fontein) and Elands Valley, 10 Sept. **1584-1591**, Carels Graf on the map, Karel Krieger's Grave (between the Karree Bergen and Buffels Bout), 11 Sept. **1592-1612/3**, Buffels Bout, 12 Sept.

PRIESKA.

1612/4-1612/12, between Klein Modder Fontein and Keikam's Poort, 13 Sept., 1811. **1613-1621**, Keikam's Poort ("Modder Gat Poort"), 13 Sept. **1622-1632**, Sand Valley (probably Bushman Pan of Schmidt's Map), 14 Sept. **1633-1644**, Banks of Orange R., 16 Sept. **1645-1650**, nr. Orange R. (between Garipe Station and shallow ford), 17 Sept.

GRIQUALAND WEST (Hay Division).

1651-1691, Asbestos Mts. at Kloof Village, 25 Sept., 1811. **1692-1695**, Asbestos Mts. between Kloof Village and Witte Water, 29 Sept. **1696-1697**, between Witte Water and Griqua Town (Klaar Water), 30 Sept. **1698-1706**, between Griqua Town and Spuugslang, 24 Oct.

GRIQUALAND (Herbert Division).

1707-1727, between Spuugslang Fontein and Vaal R., 25 Oct., 1811. **1728-1730**, right bank of Vaal R. at the confluence of the Orange R., 26 Oct. **1731-1752**, right bank of Vaal R. at Blaauwbosch Drift, 28-29 Oct. **1752**, between left bank of the Vaal R. and right bank of Riet R., 29 Oct. **1753-1780**, along the Vaal R., 2-9 Nov. **1781-1791**, between the Vaal R. and Lower Campbell, 13-14 Nov. **1792-1825**, Lower Campbell nr. the lower spring at the foot of the mtn. (= Lower Campbell of Schmidt's map), 16-18 Nov. **1826-1836**, Upper Campbell, 18 Nov.

GRIQUALAND (Hay Division).

1836/2-1836/6, between Griqua Town and Kora Groote Fontein, see Burchell's note in his catalogue, locality uncertain, 19 Nov., 1811. **1837-1881/2**, at Griqua Town, 1 Dec. **1882-1899**, Griqua Town in Leeuwenkuil valley, 14 Dec. **1900**, Asbestos Mts. at Kloof Village, 12 Dec. **1901-1961/4**, at Griqua Town, 13 Dec., 1901-30, etc. **1962-1996**, Plains between Griqua Town and Witte Water, 14 Feb, 1812. **1997-2013**, between Witte Water and Riet Fontein (or Aakaap), 15 Feb. **2014-2019**, between Riet Fontein and Kloof Village in the Asbestos Mts., 15 Feb. **2020-2065**, on the Asbestos Mts. at Kloof Village, 16 Feb. **2066-2101**, plain at foot of Asbestos Mts. between Kloof Village and

Witte Water, 17 Feb. 2102, at Griqua Town. 2103-2109, between the Kloof Village in the Asbestos Mts. and English Drift, 26 Feb. 2110-2114, at Griqua Town, Feb. 2115-2118, at Graaf Reinet, 1 April. 2119/1, 2119/5, 2120, Rhenoster Poort by the Brak R. 2119/2-2119/4, Gt. Tafelberg, nr. Richmond. 2121, Elands Fontein. 2122-2127, Rusky Station Brak R. 2128/1, Is. in Vaal R. at English Drift. 2128/13, between Brak R. and Vaal R., 18 May. 2128/17, by Brak R. 2128/18, between Kloof Town and Witte Water. 2129, on rocky hill (Waggon hill) at Griqua Town, 3 June. 2130-2135, between Griqua Town and Moses Fontein, 6 June. 2135/2, between Moses Fontein and Ongeluk, 8 June. 2135/3, Ongeluk, 10-13 June. 2136-2136/2, Doorn R., 15 June. 2137-2139, between Doorn R. and Blink Klip, 17 June. 2140-2143, Blink Klip, 18 June. 2144-2166, Klip Fontein, 19 June. 2167-2170, between Klip Fontein and Knecht's Fontein, 20 June.

BECHUANALAND.

2171, Kosi Fontein, 27 June, 1812. 2172-2182, nr. the Pass in the Kuruman Hills, 28 June. 2183-2187, Kuruman, 30 June. 2188-2192, between Kuruman and Matlowing R., 1 July. 2193-2198, Matlowing R., 5-8 July. 2199-2204, between Matlowing R. and Takun (or Old Litakuw), 10-13 July. 2205-2219, Takun (or Old Litakuw), 24-29 July. 2220, raised from a seed taken from the claw of a bird from Namagua Drift, 2 Aug. 2221-2221/2, Pellat Plains, nr. Takun, at Pintado Fountain, 8 Aug. 2222-2232, Pellat Plains, 9 Aug. 2233-2249/1, Pellat Plains (various stations), 10-28 Aug. 2249/2-2251, Pellat Plains at Jabiru Fountain nr. Takun, 30 Aug.-5 Sept. 2252-2256/2, Mashowing R., nr. Takun, 8 Sept. 2257-2265, at Takun (Old Litakuw) on the rocky ridge, 11 Sept. 2266-2272, between Takun and stone ruins of original town of Litakuw, 15 Sept. 2273-2280, at source of Mashowing R. nr. Takun, 27 Sept. 2281-2316, bank of Mashowing R. between Takun and Molito, 29-30 Sept. 2317-2330/3, plains north of the Mashowing R., 1 Oct. 2331-2340, Chooi Desert, 2 Oct. 2341-2349, Chooi Desert between Desert Stn. and Giraffe Stn., 3 Oct. 2350-2361, Chooi Desert, nr. Giraffe Stn., 3 Oct. 2362-2377, on Maadji Mt., 12 Oct. 2378-2398/2, on rocks at Chue Vley, 7-28 Oct. 2399-2405, between Chue Vley or Lake and Mashowing R., 27-28 Oct. 2406-2413, between Mashowing R. and Kuru, 30-31 Oct. 2414-2415, between "Sikuohn Stn. and Patani", 6 Nov. 2416, Patani. 2417-2426, nr. ruins at Kuruman. 2427-2435, nr. Kuruman (between Peak Stn. and Little Klibbolikhonni), 17 Nov. 2436-2451, nr. source of Kuruman R. at Little Klibbolikhonni, 18-24 Nov. 2452-2481, nr. source of Kuruman R., 25 Nov. 2482-2485/2, nr. source of Kuruman R. at Little Klibbolikhonni. 2486-2495/2, nr. source of Kuruman R. between Little Klibbolikhonni and Fig-tree Rock, 12 Dec. 2496-2524, nr. sources of Kuruman R. at Little Klibbolikhonni, 14 Dec. 2525-2548, between source of Kuruman R. and Kosi Fontein, 20 Dec. 2549-2600, Kosi Fontein, 21-25 Dec. 2601-2608, between Kosi Fontein and Knecht's Fontein, 25 Dec.

GRIQUALAND WEST (Hay Division).

2609-2617, between Knecht's Fontein and Klip Fontein, 26 Dec., 1812. 2618-2638, Klip Fontein, 26-29 Dec. 2639-2642, Bloem's Fontein, 31 Dec. 2643, Doorn R., 1 Jan., 1813. 2644-2649, Ongeluk, 1 Jan.

HOPETOWN.

2650, Brak Fontein, nr. Roode Kop, 8 Feb., 1813. 2651-2652, by the Orange R. (first stn.), 9 Feb. 2653-2655, by Orange R. (Saltpan Stn.), 11 Feb. 2655/2, by Orange R. (at narrows), 15 Feb. 2656-2663/2, by Orange R. (Amaryllis Stn.), 19 Feb. 2664-2668, by Orange R. nr. Hopetown (Hippopotamus Stn.), 24-27 Feb.

PHILIPSTOWN.

2669-2673, by Orange R., nr. Petrusville (Cross Mt. Stn.), 1 March, 1813. 2674-2676, by Orange R., nr. Petrusville (between Cross Mt. Stn. and Puff-adder Halt), 2 March. 2677-2682, between Puff-adder Halt and Bare Stn., nr. Petrusville, 2 March. 2683-2687/2, between Bare Stn. and Gnu Halt, nr. Petrusville, 3 March. 2688-2700/2, on Table Mt., nr. Horse's Grave (Paarde Berg), 5 March. 2701-2708/3, nr. Hondeblats R. (at the Horse's Grave), 6 March. 2704-2717, Bavers Pan (Rainwater Stn.), 7 March. 2718-2741, nr. Riet Fontein at "Waschbanks R.", 7 March.

COLESBERG.

2742-2747, between Riet Fontein and Plettenbergs Beacon, 11 March, 1813. **2748-2750**, between Plettenbergs Beacon and Flat Stn., 18 March. **2750/2**, at "Flat Stn.", nr. Schuilhoek Berg, 18 March. **2751-2758**, Carolus Poort, 19 March. **2759-2782**, Naaupoort, 20 March. **2783-2786**, between Woloe Kop and Rhenoster Berg, 23 March. **2787-2793**, between Woloe Kop and Rhenoster Berg, 23 March. **2794-2799/2**, nr. Middelburg (at Rock Stn.), 24 March. **2800-2808/3**, nr. Middelburg (between Rock Stn. and Seven Fonteinen), 24 March. **2809-2812**, between "Seven Fonteinen" and Wagenspad Berg, 26 March.

GRAAFF REINET.

2813-2825 and **2966**, Wagenspad Berg, 26-28 March, 1813. **2826-2837**, nr. Wagenspad Berg, on the S. side, 29 March. **2838-2860**, descent of Voor Sneeuw Berg, 29 March. **2861-2872**, along Sundayo R., N. of Monkey Ford, 30 March. **2873-2896**, along Sundays R., nr. Monkey Ford, between Piet Pretorius and Monkey Ford, 30 March. **2897-2938**, mt. on the S.W. side of Graaff Reinnet, 1 May. **2939-2940**, Graaff Reinnet by Sunday R., 7 May. **2941-2949**, between Kruid Fontein and Milk R., 13 May. **2950-2954/2**, Milk R., 14 May. **2955**, between Milk R. and Platte R., 14 May.

SOMERSET.

2956-2961, Platte R., 15 May, 1813. **2962-2965**, **2967-2984**, Blyde R., 16-17 May. **2985**, between Blyde R. and Bruintjes Hoogte, 17 May. **2986-3025**, Bruintjes Hoogte, lower part, 19 May. **3026-3104**, Bruintjes Hoogte, upper part, 20 May. **3105**, nr. Bruintjes Hoogte (in woody ravine), 23 May. **3106-3118**, nr. Bruintjes Hoogte (between Lichen Grove and Hollow Stn.), 24 May. **3119-3167/10**, on Bosch Berg, nr. Somerset East, 29 May. **3168-3174**, on Bosch Berg, along S. side, 4 June. **3175-3246/3**, on Bosch Berg, 5-21 June. **3247-3259**, Gt. Fish R., W. side at Van Aardt's, 23-24 June. **3260-3271/3**, by Little Fish R. at "Otter Stn.", 30 June. **3272-3288**, between Little Fish R. and Commadagga, 4 July. **3289-3323** at Commadagga, 5 July. **3324-3352**, mt. above spring of Commadagga, 6 July. **3353-3354**, between Commadagga and Toovertwater Poort, 7 July.

ALBANY.

3355-3429, Toovertwater Poort on rocks, 8 July, 1813. **3430-3436/2**, rocky mt. forming E. side of Toovertwater Poort, 11 July. **3437-3458**, nr. Riebeck E., between Toovertwater Poort and the E. end of Toovertwater Berg, "Soutars Post", 13 July. **3459-3509**, at Soutars Post and near Tea Fontein between Riebeck E. and Grahamstown, 25-28 July. **3510-3512/2**, between Soutars Post and Tea Fontein or E. end of Toovertwater Berg and Kurukuru R., 31 July. **3513-3528**, Kurukuru R., 1 Aug. **3529-3563**, along Rivulet at Grahamstown, 27 Aug. **3564-3606**, Wooded kloof, W. of Grahamstown, 30 Aug. **3608-3611**, nr. Grahams-town, 6-8 Sept. **3612-3624**, between Grahamstown and Blue Krantz, 8 Sept. **3625-3650/3**, Blue Krantz, 10-11 Sept. **3651-3670**, walk from Blue Krantz to Kowie Poort, 12 Sept. **3671-3679**, Blue Krantz in wooded ravine, 19 Sept.

BATHURST.

3680-3719, between Blue Krantz and Kaffir Drift Military Post, 21 Sept., 1813. **3720-3761**, mouth of Gt. Fish R., W. side, 27 Sept. **3762-3776/2**, Kaffir Drift Military Post, 22 Sept. **3777-3785/2**, between Kaffir Drift and Port Alfred (Kowie R. mouth), 23 Sept. **3786-3836**, Port Alfred, 26 Sept. **3837-3860**, between Port Alfred and Kaffir Drift (Date Tree Stn.), 28 Sept. **3861-3873/2**, nr. Kaffir Drift at Date Tree Stn., 28-29 Sept. **3874-3878**, Kaffir Drift, "Date Tree Stn.", 29 Sept. **3879-3895**, between Blue Krantz and Kowie R. Robber Stn., 30 Sept. **3896-3903**, between Blue Krantz and the source of Kasuga R., 1 Oct. **3904-3913**, source of Kasuga R. ("Lombards"), 2 Oct. **3914-3979/2**, at Reit Fontein and vicinity between Kasuga R. and Port Alfred, 3-5 Oct. **3980-4036**, nr. Port Alfred between Riet Fontein and Kowie R., 9 Oct. **4037-4054**, Riet Fontein between Kasuga R. and Port Alfred, 11 Oct. **4055-4125**, nr. Barville Park, between Riet Fontein and sea-shore, 14 Oct. **4126-4127**, nr. Theopolis, Barville Park, at Riet Fontein, 19 Oct. **4128-4155**, nr. Barville Park, between Riet Fontein and source of Kasuga R., 25 Oct.

ALBANY.

4156-4170, between source of Kasuga R. and Sidbury, 26 Oct., 1813. **4171-4177**, nr. Sidbury, at Assegai Bosch, 27 Oct. **4178-4199**, between Sidbury and the Bushman's R., 28 Oct. **4200-4206**, along Bushmans R. by Rautenbach's Drift, 2 Nov.

ALEXANDRIA.

4207-4216, between Rautenbach's Drift and Addo Drift, 4 Nov., 1813.

UITENHAGE.

4217-4221, Sand Fontein, nr. Coega R., 7 Nov., 1813. **4222-4274**, at and near Uitenhage, 13 Nov.-1 Dec.

UITENHAGE AND PORT ELIZABETH.

4275-4288, between Uitenhage and Algoa Bay, 4 Dec., 1813.

PORT ELIZABETH.

4289-4300, Port Elizabeth, on sandhills, close to sea-shore, 6 Dec., 1813. **4301-4323**, Port Elizabeth, nr. Burying Ground, 11 Dec. **4324-4346**, Port Elizabeth, nr. Blockhouse, 13 Dec. **4347-4363**, along the Bakens R., nr. Port Elizabeth, 14 Dec. **4364-4378/4**, Port Elizabeth, 17-18 Dec. **4379-4398**, Cape Recife, 24 Dec. **4399**, between Port Elizabeth and Bethelsdorp, 25 Dec.

UITENHAGE.

4399/2-4405, between Bethelsdorp and Uitenhage, 27 Dec., 1813. **4406-4413**, at Uitenhage, 1 Jan., 1814. **4414-4417**, between Uitenhage and the Chalybeate Spring by Coega R., 4 Jan. **4418-4422**, Uitenhage, 5 Jan. **4423-4438/3**, at Uitenhage by Zwartkops R., 12 Jan. **4439-4448**, at Uitenhage, 15-21 Jan. **4449-4471**, nr. Uitenhage, 26 Jan.

PORT ELIZABETH.

4472-4482, between Drostky Farm and the Leadmine, nr. Maitland R., 27 Jan., 1814.

UITENHAGE.

4483-4512, at and nr. Leadmine, 28-30 Jan., 1814.

PORT ELIZABETH.

4513-4573, around Krakakamma, Feb., 1814. **4574-4605**, between Krakakamma and Maitland R., 7 Feb. **4606-4625**, at upper part of Maitland R., 7 Feb.

UITENHAGE.

4626-4650, by rivulet between Maitland R. and Van Stadens R., 7 Feb., 1814. **4651-4658**, Van Stadens R., nr. Ford, 8 Feb. **4659-4670**, Van Stadens R., in forest nr. Ford, 9 Feb. **4671-4682/5**, between Van Stadens R. and Galgebosch, 11 Feb. **4683-4756**, on Van Stadens Berg, nearest to Galgebosch, 14 Feb. **4757-4789**, between Galgebosch and Melk R., 17 Feb.

HUMANSDORP.

4790-4802/3, between Melk R. and Gamtoos R., 18 Feb., 1814. **4803-4807**, between Gamtoos R. and Lecuwenbosch R., a branch of the Kromme R., 21 Feb. **4808-4809**, by Leeuwenbosch R., a branch of the Kromme R., 22 Feb. **4810-4820**, Twee Fontein, 27 Feb. **4821-4837**, between Twee Fontein and Essensbosch, 2 March. **4838-4884**, N. side of Kromme R., nr. Wagenboom Stn., 7 March. **4885**, by Kromme R. at Wagenbooms Stn., 9 March. **4886-4895**, a kloof E. and between sources of Kromme R. and Wagenbooms R., 10 March.

UNIONDALE.

4896-4937, a kloof, mt. sides nr. W. bank of Wagenbooms R., 11 March, 1814. **4938-4944**, kloof between Wagenbooms R. and Krakeel R., 12 March. **4945-4950**, kloof at Aapies R., "Anagallis Stn.", 13 March. **4951-4966**, kloof between Aapies R. and Roode Krantz R., 13 March. **4967-4976**, kloof between

Roode Krantz R. and Haarlem, 14 March. 4977-5028/2, kloof on rocky hill nr. Haarlem, 14 March. 5029-5037, kloof between Haarlem and Avontuur, 17 March. 5038-5066, kloof between Avontuur and sources of Keurbooms R., 18 March. 5067-5082, kloof about source of Keurbooms R., 20 March. 5083-5098/13, kloof in mt. nr. source of Keurbooms R., 22 March. 5099-5110, along Nuakamma, a small rivulet running into Keurbooms R., 23 March. 5111-5122, banks of rivulet at Romans Kraal, nr. Edmonton, 24 March. 5123-5133, Keurbooms R., between Nuakamma R. and Romans Kraal, 24 March. 5134-5144/7, nr. Keurbooms R. (Mantis Stn. and Cloete's Kraal), 25 March. 5145-5150/14, nr. Keurbooms R. (in deep woody ravine by streamlet at Cloete's Kraal), 26 March.

KNYSNA.

5151-5167, nr. Keurbooms R. (between Cloete's Kraal and Paarde Kraal, 26 March, 1814. 5168-5182, nr. Keurbooms R. (at Paarde Kraal), 27 March. 5183-5197/3, on Paarde Berg, 27 March. 5198-5251, Kaatje's Kraal on forest and by rivulet (nr. Yzer Nek), Mar. 30-Apr. 1. 5252-5268, nr. Yzer Nek and in walk to Hartebeest Flats, 3 April. 5269-5273/2, nr. Yzer Nek, in forest, 5 April. 5274-5279, between Keurbooms R. and Bitou R., 8 April. 5280-5281, nr. Stofpad (between Kaatjes Kraal and Van der Wat's), 9 April. 5282-5295, nr. Stofpad (in forest at Van der Wat's), 10 April. 5296-5305, nr. Bitou R. (between Van der Wat's and Diep R. - Bitou R.), 12 April. 5306-5323, Plettenbergs Bay, sandhills, 14 April. 5324-5345, Plettenbergs Bay, on Baak Hill and hills nr. it, 17 April. 5346-5347, Plettenbergs Bay on seashore, 21 April. 5348-5379, between Plettenbergs Bay and Knysna (Melkhout Kraal), 22 April. 5380-5385, between Knysna and mouth of Knysna R., 29 April. 5386-5390, nr. Knysna, 1 May. 5391-5431/2, Knysna in forest by quarry, 6 May. 5432-5440/3, Knysna in forest by quarry, 10 May. 5441-5446, Knysna in forest by quarry, 11 May. 5447, in forest at Knysna, 31 May. 5448, in forest at Knysna, 7 June. 5449-5465, on hills nr. Knysna, 8 June. 5466-5483/2, nr. Knysna, 20 June. 5484-5487, nr. Knysna from hills, 23 June. 5488-5493, nr. Knysna, 26 June. 5494-5507, nr. Knysna, 29 June. 5508-5518, between Knysna and mouth of Knysna R., 3 July. 5519-5520, nr. Knysna, brought to Mr. Burchell from the "Houtbosch", 11 July. 5521-5522, Knysna R. ford, 12 July. 5523-5538, nr. Knysna R. ford, W. side, 13 July. 5539-5542, nr. Knysna R. ford, in forest, 20 July. 5543-5547, at Knysna, 25 July. 5548, Knysna, 31 July. 5549-5550, Melkhout Kraal, nr. Knysna, 2 Aug. 5551-5554, between Knysna and Knysna R. ford, 5 Aug. 5555-5567, between Knysna R. ford and Goukamma R., 6 Aug. 5568-5604/3, nr. Gouwkamma R., 7 Aug. 5605-5623, between Goukamma R. and Groene Vallei, W. end, 8 Aug. 5624-5646, nr. W. side of Groene Vallei, 9 Aug. 5647-5667, on sandhills nr. W. end of Groene Vallei, 12 Aug. 5668-5684/5, between Groene Vallei and Zwart Vallei, 12 Aug. 5685-5696, between Zwart Vallei and W. end of Lange Vallei, 13 Aug.

GEORGE DIVISION.

5697-5700, nr. Lange Vallei, W. end, 14 Aug., 1814. 5701-5711, rocky hill nr. W. end of Lange Vallei, 18 Aug. 5711/2, between Lange Vallei and Touw R., 18 Aug. 5712-5729, in forest, nr. Touw R., 20 Aug. 5730-5754, nr. Touw R., not in forest, 21 Aug. 5755-5764, in forest, nr. Touw R., 22 Aug. 5765-5784, between Touw R. and Kaymans R., 24 Aug. 5785-5806, W. side of Kaymans R., 26 Aug. 5807-5809, in wood by W. bank of Kaymans R., 28 Aug. 5814-5815, nr. George in forest, 30 Aug. 5816-5834, nr. George, in forest, 2 Sept. 5835-5843/2, nr. George, in forest, 5 Sept. 5844-5891, nr. George, in forest, 8 Sept. 5892-5922, on Cradock Berg, nr. George, 11 Sept. 5923-5992, on Cradock Berg, nr. George, 12 Sept. 5993-6008, nr. George, 15 Sept. 6009-6032, lower part of Cradock Berg, nr. George, 20 Sept. 6033-6035, nr. George, 23 Sept. 6036-6054, nr. George, in forest, 25 Sept. 6055-6067, nr. George, on plain, 29 Sept. 6068-6069, nr. George, 2 Oct. 6070-6084/2, nr. George, in forest, 4 Oct. 6085-6100, between George and Malgaten R., 6 Oct. 6101-6123/2, Wolf Drift, Malgaten R., 7 Oct. 6124-6148, between Malgaten R. and Gt. Brak R., 8 Oct.

MOSSEL BAY DIVISION.

6149-6157, W. bank of Gt. Brak R., 8 Oct., 1814. **6158-6170**, between Gt. Brak R. and Little Brak R., 9 Oct. **6171-6197/8**, Little Brak R., 10 Oct. **6198-6218/3**, between Little Brak R. and Hartenbosch, 12 Oct. **6219-6230**, between Hartenbosch and Mossel Bay, 13 Oct. **6231-6251/2**, sandy hills nr. landing-place, Mossel Bay, 18 Oct. **6252-6257**, seashore of Mossel Bay, just above high-water mark, 19 Oct. **6258-6283**, between landing-place at Mossel Bay and Cape St. Blaize, 23 Oct. **6284-6303**, rocky and sandy hills nr. landing-place at Mossel Bay, 26 Oct. **6304-6318**, nr. landing-place at Mossel Bay, 28 Oct. **6319-6339**, between Mossel Bay and Trout R., 1 Nov. **6340-6372**, between Trout R. and Duyker R., 2 Nov. **6373-6405**, between Duyker R. and Gouritz R., 3 Nov. **6406-6456/4**, on dry hills nr. E. side of Gouritz R., 5 Nov. **6457-6503**, dry channel of arm of Gouritz R., 6 Nov.

RIVERSDALE DIVISION.

6504-6527, between Gouritz R. and Gt. Valsch R., 8 Nov., 1814. **6528-6558**, Valsch R., 9 Nov. **6559-6605**, between Gt. Valsch R. and Troetemelks R., 10 Nov. **6606-6620**, by Troetemelks R., 11-14 Nov. **6621-6738/2**, nr. Troetemelks R., 17 Nov. **6739-6753**, hills nr. Troetemelks R., 20 Nov. **6754-6804/9**, hills nr. Troetemelks R., 21 Nov. **6805-6813**, by Troetemelks R., 23 Nov. **6814-6854**, between Troetemelks R. and Little Vette R., 25 Nov. **6855-6927**, between Little Vette R. and Garcias Pass, 28 Nov. **6928-6963**, lower part of Lange Bergen at Garcias Pass, 1 Dec. **6964-6997/2**, about the waterfall at Garcias Pass, 2 Dec. **6998-7016**, above Garcias Pass, 3 Dec. **7017-7025**, nr. waterfall at Garcias Pass, 5 Dec. **7026-7040**, Garcias Pass, 6 Nov. **7041-7050**, along river in Garcias Pass, 7 Dec. **7051-7054**, at waterfall in Garcias Pass, 8 Dec. **7055-7102**, on Kampsche Berg., 9 Dec. **7103-7133**, summit of Kampsche Berg., 10 Dec. **7134-7137**, by rivulet in Garcias Pass, 13 Dec. **7138-7155**, nr. Garcias Pass, 14 Dec. **7156-7160**, Garcias Pass, 19 Dec. **7161-7193**, between Garcias Pass and Krombeks R., 21 Dec. **7194-7196**, between Krombeks R. and Spiegel R., 22 Dec. **7197-7208**, dry hills nr. Spiegel R., 24 Dec. **7209-7213**, between Spiegel R. and Duivenhoks R., nr. Platte Kloof, 25 Dec.

SWELLENDAAM DIVISION.

7214-7217, between Duivenhoks R. and Grootvaders Bosch, 26 Dec., 1814. **7218-7224**, Grootvaders Bosch, Dec. 27. **7225-7255**, Grootvaders Bosch in forest, 29 Dec. **7256**, between Grootvaders Bosch and Zuurbraak, 31 Dec. **7257-7263**, between Grootvaders Bosch and Zuurbraak, 1 Jan., 1815. **7264**, in Buffeljagts R. at Zuurbraak, 3 Jan. **7265-7277**, between Zuurbraak and Buffeljagts R. Drift, 4 Jan. **7278-7289**, at Buffeljagts R. Drift, 5 Jan. **7290-7295**, between Buffeljagts R. Drift and Swellendam, 6 Jan. **7296-7327**, mtn. nr. Swellendam, 14 Jan. **7328-7370**, summit of mtn. peak nr. Swellendam, 15 Jan. **7371-7428**, on mtn. peak nr. Swellendam, 16 Jan. **7429-7435**, nr. Swellendam, at foot of Lange Bergen, 21 Jan. **7436-7440**, hills nr. Swellendam, 22 Jan. **7441-7453**, between Swellendam and Breede R., 25 Jan. **7454-7488**, on dry hills nr. Breede R., 26 Jan. **7489-7495**, between Breede R. and Zonder Einde R., 26 Jan. **7496-7525**, right bank of Zonder Einde R., 27 Jan. **7526-7534**, in and nr. Hessaquas Kloof, 28 Jan.

CALEDON.

7535-7548/2, by Zonder Einde R., 29 Jan., 1815. **7549-7565**, stony hill nr. Ganze Kraal, 12 Feb. **7566-7693**, Tsoetemelks Valley, 13 Feb. **7594-7673**, mtn. of Baviaans Kloof, nr. Genadendal, 15 Feb. **7674-7774**, tops of mtns. of Genadendal, 16 Feb. **7775-7809**, mtn. of Baviaans Kloof, nr. Genadendal, 16-17 Feb. **7810-7905**, 27 Feb. **7906-7912**, at Genadendal, 1 March. **7913-7931**, between Genadendal and Donker Hoek, 7 March. **7932-7937**, between Genadendal and Donker Hoek, 8 March. **7938-7988**, Donker Hoek Mtn., 9 March. **7989-8006**, Donker Hoek Mtn., 10 March. **8007-8011/2**, between Donker Hoek and Houw Hoek Mtns., 10 March. **8012-8026**, between Donker Hoek and Houw Hoek Mtns., 11 March. **8027-8076**, Nieuw Kloof, Houw Hoek Mtn., 16

March. **8077-8119**, Nieuw Kloof, Houw Hoek Mtns., 18 March. **8120-8158**, Nieuw Kloof, Houw Hoek Mtns., 20 March. **8159-8170**, between Houw Hoek Mtns. and Palmiet R., 21 March. **8171-8187**, between Palmiet R. and Lowrys Pass, 22 March.

STELLENBOSCH.

8188-8235, Mtns. Lowrys Pass, 25 March, 1815. **8236-8276**, in Lowrys Pass, 29 March. **8277-8296**, nr. Lowrys Pass, 30 March. **8297-8333**, between Lowrys Pass and Jonkers Hoek, 30 March. **8334-8337**, between Jonkers Hoek and Stellenbosch, 1 April. **8338-8343**, between Stellenbosch and Bottelary Hill, 6 April. **8344-8375**, between Stellenbosch and Cape Flats, 12 April

CAPE.

8376-8395, Cape Flats, 13 April, 1815. **8396**, Cape Town Botanic Garden, 25 April. **8397-8408**, nr. Cape Town, 22 May. **8409-8411**, nr. Cape Town, 12 June. **8412-8440/2**, lower part of Table Mtn., 16 June. **8441-8454**, Lion Mtn. (Lion's Rump), 18 June. **8452/2**, nr. Cape Town, 7 July. **8455-8515/9**, Devils Mtn., 20 July. **8516-8593**, Cape Flats between Cape Town and Simons Bay, 25 July. **8594-8613**, on beach of Table Bay, 25 July.

CALEDON.

8614-8641, on mtn. nr. Genadendal, 12 April, 1811.

WORCESTER.

8642-8643/2, between Genadendal and Tulbagh, 12 April, 1811.

TULBAGH.

8644-8732, on Witzen Berg Range, nr. Tulbagh, 17 April, 1811.

CAPE.

8733-8737, from Mr. Hesse's garden in Cape Town, 1 Aug., 1815. **8738**, Lion Mtn. **8739**, Malmesbury Div. or Clanwillian Division. **8740**, *Satyrium cuculatum*, no locality.

Ecklon, 1823.—Christian Frederick Ecklon¹ was born at Apenrade in Schleswig-Holstein, Denmark, in December 1795. He studied to be an apothecary, and applied himself to the study of the botany of his own neighbourhood.

In October 1823 he proceeded to the Cape and became an assistant to Polemann, in Strand Street, who had rambled with Burchell on the Cape Peninsula. For four years he employed his leisure time in exploring the flora of Table Mountain and the districts round about.

In 1827 Ecklon sent large collections to Europe to be made into sets and sold, and next year he returned to Europe with further material. Through the interest of several influential scientists a small pension was granted him by the King of Denmark. With this to help him and the patronage of the *Unio Itineraria*, a sort of botanical exchange club at Esslingen, he returned to South Africa in 1829 and recommenced collecting on the Cape Peninsula and in "Ceded Territory". At this period he collaborated with Karl Zeyher to unite their collections. Zeyher went alone to Clanwilliam, the Oliphants River, and the Cederbergen, reaching Namaqualand and the Orange River.

In the meantime Ecklon botanised from Algoa Bay to the Winterhoek. On his return to Cape Town he arranged his collections and

¹ See MacOwan, *loc. cit.*, p. xlv.

made periodic excursions, on one of which he met Zeyher on his way back from Namaqualand.

Together they made a great expedition to the Eastern Frontier, following more or less the route of Thunberg from Swellendam eastwards. They reached the Koonap and Kat River, and eventually the Kei River, and they explored the Katberg and Chumiberg. For notes on the disposal of these great collections, and Ecklon's personal history afterwards, the reader is referred to MacOwan's paper already quoted. Ecklon died at Cape Town in 1868 at the age of 73.

Zeyher, 1822.—Karl Zeyher was born at Dillenberg in 1799, and served under his uncle, J. M. Zeyher, head gardener to the Grand Duke Karl Theodore of Baden. Later Zeyher accompanied F. W. Sieber to Mauritius, whence he returned to the Cape in 1822, where he collected until he joined forces with Ecklon in 1829. On Ecklon's departure to Europe, Zeyher proceeded to Uitenhage, where he collected. **Burke, 1829.**—From here he joined James Burke, a zoological collector sent out by the Earl of Derby. Zeyher's journal was published in Hooker's *London Journal of Botany* (5 : 109–134, 313–343 (1846)), and in the *Journal of Botany and Kew Garden Miscellany* (7 : 326–334 ; 362–370 (1855)). He travelled with Burke as far as the Transvaal, and made valuable collections in the Magaliesberg.

In 1843 Zeyher made a second trip to Namaqualand, and returned to Kew to arrange for the sale of his collections, returning to Cape Town in 1847. During the remainder of his life he appears to have struggled hard against poverty until his death from small-pox in 1858.

Drège, 1826.—J. F. Drège's collection of South African plants rivals any other made in the country. He was a native of Altona, near Hamburg, and arrived at the Cape in 1826. He explored the south-western districts, and collected in the Karoo, etc. For two years he stayed at Paarl, and made excursions from there. In 1829 he travelled along the Zwartberg eastwards to the Sunday's River, through the Zwartruggens, northwards past Graaf-Reinet to the Sneeuweberg, thence south-east to Albany, and finally back to the Cape by way of Uitenhage, Langkloof, and Swellendam. Next year he visited Namaqualand, the Cederbergen, and the Onder Bokkeveld.

Afterwards he again travelled east as far as the Umgeni River (Natal) with the zoologist, Dr. Andrew Smith, and returned to Uitenhage and Albany, and collected in the districts northwards as far as the Orange River. On returning to Cape Town he again visited the lower course of the Oliphants River.

According to Meyer's estimate, quoted by MacOwan (*loc. cit.*, p. 2) Drège collected about 8000 species, represented by 200,000 specimens. They were made up into many sets, and are to be found in most of the larger European herbaria. MacOwan remarks that though no particulars exist of this wonderful collector outside botanical circles, his labours were enough to have made famous half a dozen scampering travellers of the ordinary type. Drège's plants are recorded in his *Zwei Pflanzengeographische Documente*, published in 1843. Drège retired to his native Altona, and died in 1881.

Pappe.—Karl W. L. Pappe was born at Hamburg in 1803. He resided and practised medicine at Cape Town, and his botanical publications are noted in the chapter on literature. He collected

extensively in the Cape districts, and his collection, together with Zeyher's private set of plants, which he incorporated with his own, formed the nucleus of the herbarium now at the South African Museum at Cape Town.

Plant, 1850.—In 1850 Mr. R. W. Plant, a "zealous naturalist and able collector",¹ sailed for Port Natal [= Durban], with a view to making researches in the interior of that little-known country, chiefly in relation to botany. In 1852² he published an account of his journey to the Zulu country.

He rode on the back of an ox, the usual equipage at that time, with another, the "sumpter-ox", to carry blankets and other necessities. He travelled by the Umvoti, which then marked the limit of civilisation. Two days brought him to the Tugela River, where he met a lion, which incident determined him to move on to the Zulu country. Soon, he says, "the number of hyaenas and tigers [leopards] seemed to increase with each march, until they grew so bold that fires would not keep them off, and three or four volleys were often necessary to drive them back". He crossed the Umlilassi, where his ox was nearly drowned, then the Umsatense River, to the Umgoa River. Between the last-mentioned two he speaks of a small Labiate plant cultivated for use as tobacco, probably a *Plectranthus*. He also remarked on the large number of beautiful terrestrial orchids.

Plant proceeded by the Umpongo River to St. Lucia Bay, near which he saw herds of elephants. On his return he had difficulty in passing through country in which the natives were at war, but after that a good collection of bulbs was made, which were grown at Kew.

The genus *Plantia*, now reduced to *Hexaglottis* (IRIDACEAE), was named in his honour by Herbert. Plant's specimens are in the Kew Herbarium.

MacOwan, 1861.—Dr. Peter MacOwan, F.L.S., was born at Hull, England, on 14th November, 1830. He was the son of a Methodist minister. Owing to ill-health he left England for South Africa in 1861, to take charge of a projected college in Grahamstown. The voyage restored him to health. He remained at Grahamstown until 1869, having collected extensively in the district. He then took up a post as science master at Gill College, Somerset East.

In 1881 MacOwan was appointed Director of the Cape Town Botanic Gardens, Curator of the Government Herbarium, and became, in addition, Professor of Botany at the South African College. In 1891 he resigned the directorship of the gardens and became Government Botanist in charge of the herbarium. He retired in 1905.

The farming community of South Africa owe much to MacOwan, for he first introduced the Australian salt-bush, *Atriplex semibaccata*, and other species, which provide a valuable pasture for vast areas of otherwise useless brak-land. He was also responsible for establishing the fruit industry on a big scale.

The bulk of MacOwan's herbarium, comprising about 14,000 sheets of Phanerogams and 1800 Fungi, is at the Albany Museum, Grahamstown.

From the biological point of view it was perhaps unfortunate that

¹ See Hooker, *Kew Journ. of Botany*, 4 : 222 (1852).

² *Loc. cit.*, 257.

MacOwan was so well versed in the classics, quotations from which amount almost to a blemish in his writings. His field labels, too, contained little but Latin "tags" about the locality, and nothing about the plants themselves—a fault in which he was imitated by several of his contemporaries.

The number of collectors of South African plants since the publication of the first three volumes of Harvey and Sonder's *Flora Capensis* in 1864–5 is almost legion. Their names are mostly recorded in the later volumes of that work, and Dr. E. P. Phillips dealt with them very comprehensively in his presidential address to the South African Association for the Advancement of Science in 1930, *S. Afr. Journ. Sci.*, **27**: pp. 39–80.

Chief among them have been R. S. Adamson (S.W. districts), H. Bolus (general), L. Bolus (general), L. Britten (Albany and Bathurst), E. G. Bryant (Prieska), J. Burt Davy (general), R. H. Compton (S.W. districts), A. Dieterlen (Basutoland), Dinter (S.W. Africa), Wolley-Dod (Cape districts), I. L. Drège (Port Elizabeth), R. A. Dyer (various), H. S. Flanagan (eastern districts), H. Forbes (Natal), H. G. Fourcade (Knysna to Humansdorp), E. Galpin (general), Mrs. Gillett and J. B. Gillett (general), J. Hutchinson (general), Miss Leendertz (Mrs. R. Pott) (Transvaal), M. S. Levyns (general), F. R. Long (Port Elizabeth), R. Marloth (general), A. O. D. Mogg (general), C. E. Moss (Transvaal), J. Muir (Riversdale), F. Paterson (south-east), Miss Pegler (Transkei), H. H. W. Pearson (western districts), E. P. Phillips (general), N. S. Pillans (general), I. B. Pole Evans (general), G. Potts (Bloemfontein), G. Rattray (East London), A. Rehmann (Transvaal), F. A. Rogers (general), Hon. Mrs. Ryder (southwest), R. Schlechter (general), H. Schinz (S.W. Africa), S. Schönland (south-east), C. A. Smith (Faure-smith), J. C. Smuts (general), T. P. Stokoe (Western Mts.), J. Thode (Natal), G. Thorncroft (Eastern Transvaal), W. Tyson (eastern districts), I. C. Verdoorn (Pretoria, etc.), M. Wilman (Kimberley district), F. Wilms (Transvaal), J. Medley Wood (mainly Natal), and *many others* whose names are recorded in the pages of the *Flora Capensis* and other works.

Recently Paymaster-Captain Salter, a retired naval officer, has added greatly to our knowledge and to several herbaria by intensive and selective collecting, including in particular the genus *Oxalis*. It is this kind of collecting which is now so much desired for herbaria.

Among so many names famous in the annals of South African botanical collecting, at least four seem worthy of special notice. These are Medley Wood, H. Bolus, R. Schlechter, and Rudolf Marloth, who, besides collecting extensively, made great contributions to the literature of South African botany.

Medley Wood, 1827.—Medley Wood was born at Mansfield, Notts, on 1st December, 1827, and died at Durban on 26th August, 1915, aged 88 years. He spent over 60 years in Natal, and was actively engaged in botanical pursuits to the end of his life. He lived for many years at Inanda, and in 1882 succeeded McKen as Curator of

the Durban Botanical Garden. He held this post for 33 years, and built up a fine herbarium at Durban. He was assisted at various times by Miss Franks, Mr. Haygarth, and Mr. Wylie, the last mentioned succeeding him as Curator. An account of Medley Wood's life (with portrait) will be found in the *Annals of the Bolus Herbarium*, 2 : 33-36.

Bolus, 1850.—Harry Bolus, like Robert Brown in his day in England, might well be described as having been the *facile princeps* collector-botanist in South Africa. He was a very good collector, and he had the wealth and leisure to publish the results of his field work and to found a valuable herbarium, which was left on his death to the University of Cape Town (see p. 29). Phillips¹ pays a warm tribute to him : "There can be no doubt that Bolus is the outstanding figure in South African botany. He saw the end of the early period, was acquainted with Harvey, and was the first to cement the connection of South Africa with Kew".

To give here an account of his journeys would be but to repeat what has already been published by Pearson,² whose paper provides most interesting reading. Bolus was born in Nottingham, and at the age of 15 went to South Africa as apprentice to a merchant in Grahamstown, a friend of his schoolmaster. He sailed on 12th December, 1849, on the barque *Jane*, 300 tons, which reached Algoa Bay ninety-four days later ! In 1861 he came into contact with Professor F. Guthrie of the Graaff Reinet College, with whom he collaborated later in working out the ERICACEAE, a colossal task, for the *Flora Capensis*. Botany soon became his ruling passion, and remained so until his death. In the intervals of collecting he often visited Kew and became personal friends with many of the staff, particularly Sir Joseph Hooker and Professor Daniel Oliver. He developed keen interest in orchids, and drew and coloured many of his own plates.

His *Sketch of the Floral Regions of South Africa* is a classic, and his *List of the Flowering Plants and Ferns of the Cape Peninsula* a record of careful collecting and naming in collaboration with Major Wolley-Dod, R.A.

Bolus visited England for the last time in 1911, and died at Oxted in East Surrey on 25th May of that year. He is buried in the churchyard there, not many miles from Downe, where lie the remains of Charles Darwin.

Rudolf Marloth.—Dr. Rudolf Marloth arrived in South Africa in 1883. Although more or less contemporary with Bolus, MacOwan, and Medley Wood, his work shows ample evidence of more modern methods of botanical research. Where Marloth differed from them was mainly in his field work. Although sometimes an indifferent collector, he was a very acute observer of plants in the field and of all biological phenomena connected with them. He was by profession an analytical chemist, and an expert photographer. According to Phillips, his herbarium consists of over 13,000 specimens, from various parts of the country which he visited in connection with his pro-

¹ E. P. Phillips, Presidential Address to Section C, *S. Afr. Journ. Sci.*, 27 : 48 (1930).

² H. H. W. Pearson ("Harry Bolus", *Report S. Afr. Assoc. Adv. Sci.*, 1911 : pp. 69-79, with portrait, botanical journeys and list of published writings).

fessional studies. He once said to Phillips, "For a man to succeed in science he must work twenty-four hours a day".

Marloth died at Caledon in 1931, and his herbarium was acquired some years previously for the National Collection at Pretoria. Most of his duplicates were sent to the Berlin Herbarium.

Rudolf Schlechter.—Rudolf Schlechter, the son of a lithographer, was born in Berlin on 16th October, 1872. By profession he became a gardener, and worked for some time as an assistant in the Berlin University garden. He had a talent for drawing, and inherited from his father a love of Nature and the *wanderlust*.

So, at the age of 19, he travelled to South Africa to explore the Cape flora. He was employed by Dr. H. Bolus in his then private herbarium, and he collected extensively, often with Marloth and MacOwan. Starting in October 1892, he travelled along the coast route as far as Natal, where he met Medley Wood, and later crossed Natal and the Transvaal as far as the Limpopo, returning to Cape Town in April 1894. There he again collected extensively, leaving for home via Durban in April 1895. The botanical collections made on these journeys, amounting to about 7000 numbers, were acquired by Professor Schinz for the Zurich Botanic Gardens herbarium, and many sets of duplicates were distributed, to Berlin, Kew, Bolus Herbarium, etc.

Late in the same year (1895) Schlechter returned to South Africa and started to collect again, this time on behalf of the Berlin Botanical Museum. In May 1896 he was joined by his younger brother Max, and they travelled together to Little Namaqualand. We are told¹ that the brothers collected, where possible, as many as 100 specimens of each species! They returned in September, and made further journeys in the south-western Cape, in the intervals working out the collections as far as possible.

In August 1897 the brothers set out for another trip to Little Namaqualand, visiting the Khamiesberg on the way to the Orange River. Thence they proceeded to Port Nolloth, and returned by sea to Cape Town. Thereafter the brothers parted, Max settling in South-West Africa, whilst Rudolf set out for home via Durban and Lourenço Marques, in Portuguese East Africa, where he made valuable collections. He penetrated inland as far as Komati Poort and the forests of Mokokololo, and later explored for rubber plants. During this period his health was greatly undermined, and he left Lourenço Marques in March 1898, suffering from fever and dysentery nearly all the way home.

That completed his connection with South Africa, except for numerous papers on its botany which he continued to write until the end of his life. After his return he studied at the Berlin University under Engler and others, and made further trips into the tropics, to the Cameroons, Belgian Congo, and Togoland, Malaya, and New Guinea, ending his travels in 1910.

From 1893 onwards Schlechter published numerous botanical papers, a list of which is given by Loesener (*loc. cit.*, p. 939), mainly on South African ASCLEPIADACEAE and ORCHIDACEAE, families in which he was specially interested.

¹ See Loesener, "Rudolf Schlechter's Leben und Wirken", in *Notizbl. Bot. Gart. Berlin*, 9: 914 (1926).

In the library of the Kew Herbarium there is a manuscript list of Schlechter's localities, compiled from his labels by the late Dr. N. E. Brown. It is a great pity that Dr. Schlechter, as he became later, did not live long enough to write an account of his own life and travels. Such would have been a story of hardship and endeavour scarcely equalled by anyone in the history of botanical exploration. He died in November 1925, in his fifty-third year.

Chapter XXXII

A NEW PHYLOGENETIC ARRANGEMENT OF THE FAMILIES OF GYMNOSPERMS AND FLOWERING PLANTS REPRESENTED IN SOUTH AFRICA

GEOLOGISTS discovered long ago that the various strata of rocks exposed at the earth's surface could be arranged in chronological order, and when so disposed they represent a sequence covering a very long period of time. Botanists have very slowly realised that something similar may be ascertained from a consideration of the structure of plants, and the families of plants arranged in a similar way.

The following is the sequence of the families of Gymnosperms and Flowering Plants used by the author in his *Families of Flowering Plants*,¹ but with some very important modifications.

In that work it was stated that

"With the exception of the primary division into Dicotyledons and Monocotyledons large groups are usually artificial, especially if the characteristic fixed upon to distinguish them is a general tendency and founded on a *single character*. Examples are the De Candolleian artificial groups THALAMIFLORAE, DISCIFLORAE, CALYCIFLORAE, INFERRAE, and to a less extent the PARIETALES, CENTROSPERMAE, and AMENTIFERAE. The special characteristics indicated by the names of these groups are general tendencies in many families of flowering plants.

Although it is still very convenient to recognise two main groups of Dicotyledons as ARCHICHLAMYDEAE (Polypetalae + Monochlamydeae) and METACHLAMYDEAE (Gamopetalae, Sympetalae, etc.), a *phylogenetic classification would be better attained if the gamopetalous character were regarded in its true light, i.e. as a general tendency, for gamopetaly is quite a common feature in many so-called polypetalous families.*"

Since then I have given this point much further study, and I feel that I am now justified in making the change foreshadowed in the italicised part of the quotation, and to distribute the gamopetalous families among their nearest relations in the ARCHICHLAMYDEAE.

Furthermore, I am more than ever convinced that the recognition of two main phyla, *one fundamentally and remaining predominantly woody, the other fundamentally and remaining predominantly herbaceous*, is a sound and very probable hypothesis, and that by this means parallelisms in floral structure which were formerly considered to be relationships may be more clearly recognised. Conspicuous examples of this are ARALIACEAE and UMBELLIFERAE, the one woody, the other herbaceous, and in consequence they will be found widely separated in this new arrangement. Other good examples are the CUNONIACEAE and GREYIACEAE, which were formerly associated with the more herbaceous SAXIFRAGACEAE, but from which these two families are far removed in the present classification.

I have at last the courage of my convictions, which were only partly, and perhaps rather timidly, expressed in my earlier book,

¹ Hutchinson, *Families of Flowering Plants*, vol. i (1926); vol. ii (1934) (Macmillan & Co., London).

and I have now separated the *woody* from the *herbaceous* phylum as represented by the families of flowering plants in South Africa. The complete new scheme for the world families will appear in another work.

Under each of these two main phyla the families have been arranged in as logical a sequence as possible, beginning with those showing the most primitive types of flowers and ending with the more advanced. The woody and herbaceous branches are considered to have been evolved side by side, the woody being probably the older. As South Africa is deficient in some important *basic groups*, these have been inserted in square brackets [], in order to render the scheme more intelligible.

To make the arrangement as clear as possible there is given at the end of this chapter a diagram showing the phylogeny of the principal groups. It should be remembered, however, that it is not intended to convey the idea that families are derived from each other as they exist at the present time, but that one or more have been derived from the same basal stock as the one lower down in the family "tree".

For example, CARYOPHYLLACEAE (Caryophyllales) may have been derived from the same basal stock which gave rise to the SAXIFRAGACEAE (Saxifragales).

I shall now try to lead the student of South African botany through the intricacies of this phylogenetic system, for the more truly natural a system becomes the more difficult it is to express on paper.

Phylogeny of Woody Dicotyledons.—As already stated, the system begins with those families with the most primitive floral structure. These are found in the **Dicotyledons**. In the Northern Hemisphere it would start with the family MAGNOLIACEAE, but as there is none in Africa, we take the next nearly related family, the ANNONACEAE, with hypogynous flowers and free sepals and petals, numerous free stamens and numerous free carpels. Even in ANNONACEAE there are a few genera (not in South Africa) with united petals and syncarpous ovary, and it is therefore not a great step thence into EBENALES, embracing EBENACEAE and SAPOTACEAE, whilst the apetalous LAURALES appear also to be early derivatives.

We have now to consider very important groups centred around the ROSACEAE, and their origin may be sought for in DILLENIALES. CUNONIALES are represented very sparsely in South Africa, but they are of great phytogeographic interest. *Cunonia* (CUNONIACEAE), for example, is found only in South Africa and in the island of New Caledonia, off the east coast of Australia (see map, p. 213).

ROSACEAE are also rather sparsely represented in our area, and most are very advanced types of the family, including the large South African genus *Cliffortia*. LEGUMINOSAE are derived from ROSACEAE, the first of the three families into which they are divided being very closely related. Like ROSACEAE, the seeds are devoid of endosperm. CAESALPINIACEAE are the most primitive, and MIMOSACEAE and PAPILIONACEAE are derived from them, with increasing zygomorphy of the flower. South Africa has many woody genera of PAPILIONACEAE, and these are among the most primitive in the family, because the

stamens are often free, and not united, as they are in the more advanced tribes.

From ROSACEAE it is but a short step into HAMAMELIDALES, which are well represented in South Africa. BRUNIACEAE are endemic, and MYROTHAMNACEAE and BUXACEAE also occur. The genus *Trichocladus* is the only indigenous member of the HAMAMELIDACEAE, and it is pointed out on p. 219 that it has probably been derived from the Northern Hemisphere, where most of the family is found.

SALICALES and MYRICALES, with *Salix* and *Myrica* respectively, are well represented at the Cape. Indeed, it seems the centre of distribution for *Myrica*.

More advanced families derived from the ROSALES fall under the URTICALES, with ULMACEAE (*Celtis*) and MORACEAE (*Ficus*). According to the principles of classification on which this system is based these families cannot be primitive, as they were so regarded in the Engler and Prantl system.

Unfortunately in South Africa there are no DILLENALES (DILLENIACEAE), all of which have free carpels and numerous stamens. Families immediately derived from them, however, have a somewhat primitive type of placentation (*parietal*), and these are embraced by BIXALES (FLACOURTIACEAE), ('APPARIDALES ('APPARIDACEAE, MORINGACEAE), VIOLALES (VIOLACEAE), and PITTOSPORALES (PITTOSPORACEAE, BYBLIDACEAE), and increasingly herbaceous and climbing groups seem to have been evolved from these, retaining the parietal placentation, such as LOSALES (TURNERACEAE), PASSIFLORALES (PASSIFLORACEAE), and ('UCURBITALES ('UCURBITACEAE). ('UCURBITACEAE have no direct affinity with any sympetalous family, as might be inferred from their position in the Engler and Prantl system.

In my general system I could not at that time find a better place for THYMELAEACEAE than alongside LYTHIRACEAE in the herbaceous phylum. I confess I was misled by the great similarity of the arrangement of the stamens on the calyx-tube in the two families. But I believe that I have now discovered their true relationship, which is revealed by GONYSTYLACEAE, a small tropical family formerly placed near TILIACEAE. I now consider GONYSTYLACEAE to be derived from FLACOURTIACEAE, and from GONYSTYLACEAE it is an easy step to THYMELAEACEAE. And wherever THYMELAEACEAE go, then PROTEACEAE should also appear, as they seem to be advanced derivatives. I was never comfortable about the position of PROTEACEAE, especially, in the herbaceous phylum.

On the other hand, PROTEACEAE, being almost entirely an austral group richly represented also in Australia, may have had an independent origin from groups no longer in existence. At any rate the student should note that *Protea* with its capitulum is a genus evolved almost as much as COMPOSITAE, and *Leucadendron* with its cone-like inflorescence is equivalent to the Alders (*Alnus*), at least so far as the inflorescences are concerned.

We must now branch out again in our "tree" to a large basal stock, the TILIALES, derived from BIXALES. These are the families TILIACEAE, STERCULIACEAE, and BOMBACACEAE. The more primitive of these (TILIACEAE) have numerous free stamens, syncarpous ovary with axile placentas, and the calyx is of a more advanced type than in THEALES. It is *valvate* throughout TILIALES and MALVALES (MALVA-

CEAE), the latter becoming largely herbaceous (but often fibrous), and the stamens are increasingly monadelphous in the higher groups. Stellate hairs are very common in this alliance, and in MALPIGHIALES (MALPIGHIACEAE and ERYTHROXYLACEAE) the hairs are often medifixed. It should not be forgotten that in the woody half of our "tree" herbs are evolved here and there, for example MALVACEAE, and there are herbaceous examples in several other families, but they seem to be reduced from woody ancestors. *Triumfetta* in the TILIACEAE and *Hermannia* in the STERCULIACEAE are good examples.

I place EUPHORBIACEAE after the TILIALES and MALVALES, but they are rather a mixed group derived from various sources which are indicated in the phylogenetic "tree". The student should beware of thinking of EUPHORBIACEAE only in terms of *Euphorbia*, so common in South Africa, because it is exceptional in its own family, and is a very advanced type.

Unfortunately, again, the tea family, THEACEAE, is not indigenous in South Africa, but most people are acquainted with a *Camellia*, which belongs to this family. In THEACEAE, wherein the placentation has become axile, there are traces of the origin of ERICACEAE, so richly represented in our region. ERICACEAE is one of the least advanced of the sympetalous families because the stamens are still hypogynous, and therefore free from the corolla, and are often double the number of the corolla-lobes. The great concentration of ERICACEAE in a comparatively small area in the Southern Hemisphere (Cape Region of South Africa) is paralleled in the Northern Hemisphere by *Rhododendron*, where a very great number (800 species or so) are found in Western China, Eastern Tibet, and the Eastern Himalayas.

MYRTALES (MYRTACEAE, MELASTOMACEAE, COMBRETACEAE, and RHIZOPHORACEAE) are probably epigynous developments of THEALES, some herbs being found in MELASTOMACEAE, whilst GUTTIFERALES (HYPERICACEAE and GUTTIFERAE) are probably also derived from THEALES, but have remained hypogynous, with the stamens tending to bunch together, and there is considerable separation of the sexes (as in GUTTIFERAE).

Each time we have to descend again in our phylogenetic tree and build up from those groups which seem to be basal stocks for more advanced families. Such a group is CELASTRALES, whence several families are evolved, some being quite climax groups both as to habitat and structure; such are LORANTHACEAE, SANTALACEAE, and BALANOPHORACEAE. And from the same source we derive RHAMNALES and MYRSINALES, and more climax groups, such as RUTALES, MELIALES, and SAPINDALES.

ARALIALES (CORNACEAE and ARALIACEAE) are probably also derived from the CELASTRALES stock, and are here regarded as representing a parallelism with UMBELLIFERAE.

Sympetalous genera are found here and there in these groups circling around the CELASTRACEAE, so it is not a far step to LOGANIACEAE and OLEACEAE, still more advanced groups being APOCYNACEAE and ASCLEPIADACEAE and probably EHRETIACEAE, BIGNONIACEAE, and VERBENACEAE. Finally, from the same source comes the important family RUBIACEAE, which gives us coffee and quinine, etc. And so we have climbed our Woody Dicotyledonous "tree" to the top!

Phylogeny of Herbaceous Dicotyledons.—We now start again with the most primitive herbaceous family, RANUNCULACEAE, and its close, but a little more advanced relative, NYMPHAEACEAE. This herbaceous stock has become softly woody in *Clematis* (the wood with broad medullary rays), and MENISPERMACEAE (with similar wood) seem to be derived, with the climax families ARISTOLOCHIACEAE, CYTINACEAE, and HYDNORACEAE, ending this little branch of the family "tree".

PIPERALES (PIPERACEAE) have probably also been derived from the RANALES, and often they have scattered vascular bundles, as in Monocotyledons; but this is considered to be due to parallel development, and not an indication of the origin of any part of Monocotyledons, as suggested by Lotsy.

The next important basal stock of the herbaceous branch of our "tree" is RHOEADALES, containing the families PAPAVERACEAE and FUMARIACEAE, and families derived from them, CRUCIFERAE and RESEDACEAE, the latter two being complete climaxes.

We must again step down our "tree" a little to another important basic stock, the CARYOPHYLLACEAE and several nearly allied families. Closely related apetalous hypogynous groups are the POLYGONALES (POLYGONACEAE and ILLECEBRACEAE), and CHENOPODIALES (PHYTO-LACCACEAE, CHENOPODIACEAE, AMARANTACEAE), and the petaliferous perigynous and epigynous LYTHRALES.

From CARYOPHYLLACEAE also we may trace the origin of GENTIANALES (GENTIANACEAE), PRIMULALES (PRIMULACEAE and PLUMBAGINACEAE), and finally PLANTAGINACEAE. I cannot find a better place for CAMPANULALES than at the end of this phylogenetic "branch", and the Campanulaceous stock may have been the origin for the COMPOSITAE. This seems the best place for this huge climax family, which is so richly represented in South Africa.

Another stage upwards is represented by SAXIFRAGALES, with the families CRASSULACEAE and SAXIFRAGACEAE. In CRASSULACEAE the carpels are still free, and this ancient character may even be accompanied by a *sympetalous corolla*, as in *Kalanchoe*. In SAXIFRAGACEAE the gynoecium is largely *bicarpellate* with axile placentation, and thus the foundation is laid for the evolution of the group known as "Bicarpellatae" of the METACHLAMYDEAE (GAMOPETALAE), in addition to a few small very specialised families, such as DROSERACEAE, PODOSTEMACEAE, and HYDROSTACHYACEAE. I feel also that the bicarpellate herbaceous family UMBELLIFERAE finds its best place here, though it is very much more advanced. I regard it as a parallelism with ARALIACEAE, and not as a near relation, but here, of course, I may be mistaken. The derived bicarpellate families with a sympetalous corolla are included in the SOLANALES (SOLANACEAE and CONVULVACEAE), and the PERSONALES, the basic stock for which is the family SCROPHULARIACEAE, from which have arisen completely climax families, such as LENTIBULARIACEAE, PEDALIACEAE, and ACANTHACEAE, etc., all well represented in South Africa.

Then we have to take stock of the GERANIACEAE and allied families, so richly represented in South Africa by *Pelargonium* and *Oxalis*. They are shown in our "tree" to have probably been derived from two sources, from RANALES direct and from CARYOPHYLLALES. Another portion of SYMPETALAE may or may not have found its origin in GERANTIALES, namely the POLEMONIALES (POLEMONIACEAE), BORA-

GINALES (BORAGINACEAE), and LAMIALES, ending up with the complete climax and large family LABIATAE.

Phylogeny of Monocotyledons.—We must now consider the **Monocotyledons**. One might imagine from the name of this great phylum that it depended entirely on the number of seed-leaves. This is not the case, however, and there are several associated characters, though the single cotyledon is the most important and quite constant feature.

Associated with the single seed-leaf is the usually parallel nervation of the leaves, and these are nearly always *alternate* and without stipules, the vascular bundles of the stem are closed and scattered, and the flowers mostly trimerous. In addition, there is a strong tendency for the two whorls of the perianth to merge into one, a feature well shown in AMARYLLIDACEAE and in some LILIACEAE.

The importance of the Monocotyledonous character was first recognised by the English botanist John Ray in 1686, and he made a division of the group into two sections, those with bulbs, and those without bulbs, and he maintained a separate group for the grasses.

Haller in 1742 stressed the importance of the *superior* and *inferior* ovary, and he was thus responsible for introducing a character which has led to much artificial classification. Various authors have arranged the Monocotyledons in many different ways; some *started* with the Grasses, some *ended* with them, and some treated the Palms and the Orchids in a similar manner. Just as they treated the Dicotyledons, Engler and Prantl placed first those families that are apetalous, so their arrangement began with TYPHACEAE, PANDANACEAE, and SPARGANIACEAE, and the GRAMINEAE followed soon after. All these families are considered in our system to be very advanced, and the Grasses the most advanced of all. Engler placed the Monocotyledons before the Dicotyledons.

Importance of Calyx and Corolla.—As in our arrangement of the Dicotyledons, we regard the *hypogynous*, *apocarpous* flower as being the most primitive type. Hence in the Monocotyledons we also begin with apocarpous families such as BUTOMACEAE and ALISMATACEAE, which, however, do not grow in South Africa. A close relation of BUTOMACEAE, however, is HYDROCHARITACEAE, and this is our first family. These early groups are also characterised by a very Dicotyledonous character, *a distinct calyx and corolla*, just as in RANUNCULACEAE, and I have called them the CALYCIFERAE (calyx-bearers) in consequence. Later the two whorls become similar and more petaloid, as in LILIACEAE and AMARYLLIDACEAE, and I have termed this "branch" the COROLLIFERAE (corolla-bearers). They are the "petaloid Monocotyledons". A third branch very much reduced in floral structure and largely anemophilous is GLUMIFLORAE, containing the Sedges, the Restios, etc., and the Grasses.

In this new arrangement of the Monocotyledons the character of the superior and inferior ovary formerly employed to separate the LILIACEAE and AMARYLLIDACEAE has been partly discarded, and instead the *umbellate inflorescence* has been taken as the distinguishing feature of the latter family. For South Africans this involves the transference of *Agapanthus*, *Tulbaghia*, and *Allium* from LILIACEAE to AMARYLLIDACEAE, and so far not many have quarrelled with me about it.

The old and delightfully simple formula in our text books separating the LILIACEAE, AMARYLLIDACEAE, and IRIDACEAE, is therefore no longer considered to be tenable. Here is how it ran :—

Ovary superior; stamens 6	.	.	.	LILIACEAE.
Ovary inferior; stamens 6	.	.	.	AMARYLLIDACEAE.
Ovary inferior; stamens 3	.	.	.	IRIDACEAE.

To make a brief summary of this new classification of Monocotyledons, the principal points are: (1) the appreciation of the importance of the distinct calyx and corolla (CALYCIFERAE), (2) the new conception of AMARYLLIDACEAE as apart from LILIACEAE, and (3) the recognition of the GRAMINEAE as the complete climax of Monocotyledonous evolution.

With this short sketch I will now try to guide the student through the Monocotyledons, as has been done in the case of the Dicotyledons.

As in Dicotyledons, we begin with apocarpous families. The most primitive is ALISMATACEAE, which, as already stated, is missing from South Africa. But we have a nearly related family, HYDROCHARITACEAE, though the ovary is inferior, and further reduced derivatives, JUNCAGINACEAE, APONOGETONACEAE, and ZOSTERACEAE, whilst POTAMOGETONACEAE, RUPPIACEAE, ZANNICHELLIACEAE, and NAJADACEAE are still more reduced and advanced, and are all aquatic. The CALYCIFERAE seem to have become mainly aquatic, and even the more advanced COMMELINACEAE, in which the ovary has become syncarpous, are moisture-loving.

The "Compositae" of these groups are the XYRIDACEAE and ERIOCAULACEAE, and the "Orchidaceae" are the MUSACEAE, STRELITZIACEAE, and ZINGIBERACEAE. These are *parallelisms* of the ORCHIDACEAE, and not close relatives.

Briefly we have climbed to the tops of the branches of the CALYCIFERAE, and must now descend the "trunk" to the large basal stock, the LILIALES. This is the most primitive of the COROLLIFERAE, and from it most of the other families of Monocotyledons may be traced, even such a specialised group as ARACEAE, whose evolution is foreshadowed in tribe ASPIDISTREAE of LILIACEAE.

SMILACACEAE, DIOSCOREACEAE, ARACEAE, LEMNACEAE, and TYPHACEAE are all climax families derived from the Liliaceous stock, whilst AMARYLLIDACEAE and IRIDACEAE have each developed from the same source on independent lines.

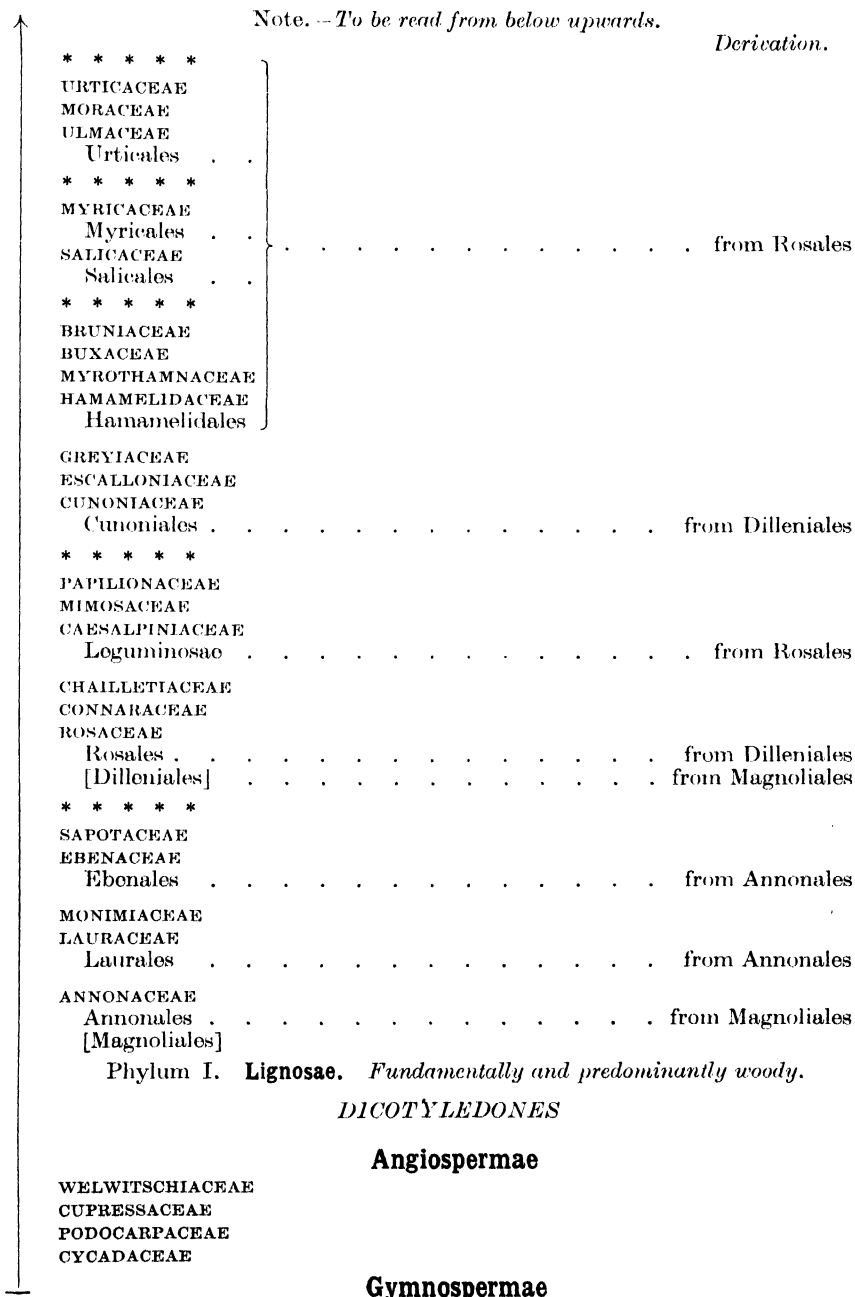
The same may be said of the AGAVACEAE and PALMAE, whilst HAEMODORACEAE, taken as a whole, seems tending towards the Orchidaceous type of plant, and leading to the large family ORCHIDACEAE, the highest expression of the COROLLIFERAE.

JUNCACEAE and RESTIONACEAE seem to be reduced groups from LILIACEAE, and CYPERACEAE forms a parallel with the GRAMINEAE, the most successful family, and which may have been partly derived from the COMMELINALES.

And so we have reached the top of our Monocotyledonous "tree", and whether we have arrived by the proper "steps and stairs" or not we can only leave to conjecture.

In the linear sequence which follows, rows of asterisks indicate completely climax families, to which the next family above is not closely related.

PHYLOGENETIC SEQUENCE OF THE FAMILIES OF SOUTH AFRICAN GYMNOSPERMS AND ANGIOSPERMS



Note.—*To be read from below upwards.*

Derivation.

* * * * *

OCHNACEAE

Theales from Bixales

* * * * *

EUPHORBIACEAE

Euphorbiales . from Tiliales, Celastrales, Rhamnales, Sapindales, etc.

LINACEAE

ERYTHROXYLACEAE

MALPIGHIACEAE

Malpighiales from Tiliales

* * * * *

MALVACEAE

Malvales from Tiliales

BOMBACACEAE

STERCULIACEAE

TILIACEAE

Tiliales from Dilleniales and Bixales

* * * * *

CACTACEAE

Cactales from Bixales

* * * * *

CUCURBITACEAE

Cucurbitales from Bixales

PASSIFLORACEAE

Passiflorales from Bixales

TURNERACEAE

LOASACEAE

Loasales from Bixales

* * * * *

POLYGALACEAE

Polygalales from Bixales

VIOLACEAE

Violales from Bixales

TAMARICACEAE

Tamaricales from Bixales

MORINGACEAE

CAPPARIDACEAE

Capparidales from Bixales

BYBLIDACEAE

PITTOSPORACEAE

Pittosporales from Dilleniales

* * * * *

PROTEACEAE

Proteales from Thymelaeales

THYMELAEACEAE

PENAEACEAE

GEISSOLOMATACEAE

Thymelaeales from Bixales

FLACOURTIACEAE

Bixales from Dilleniales

Note.—*To be read from below upwards.**Derivation.*

↑	OLEACEAE	
	EHRETIACEAE	
	LOGANIACEAE	
	Loganiales	from Celastrales
	* * * * *	
	ANACARDIACEAE	}
	MELIANTHACEAE	
	SAPINDACEAE	
	Sapindales	
	* * * * *	
	MELIACEAE	}
	Meliales	
	BURSERACEAE	
	SIMARUBACEAE	
	RUTACEAE	}
	Rutales	
	* * * * *	
	ARALIACEAE	
	CORNACEAE	
	Araliales	from Celastrales, Rhamnales
	* * * * *	
	MYRSINACEAE	
	Myrsinales	from Rhamnales
	* * * * *	
	AMPELIDACEAE	}
	HETEROPYXIDACEAE	
	RHAMNACEAE	
	Rhamnales	
	* * * * *	
	BALANOPHORACEAE	}
	GRUBBIACEAE	
	SANTALACEAE	
	LORANTHACEAE	
	Santalales	Mainly from Theales
	OPIACEAE	
	OLACACEAE	
	Olacales	
	SALVADORACEAE	
	ICACINACEAE	
	HIPPOCRATEACEAE	
	AQUIFOLIACEAE	
	CELASTRACEAE	
	Celastrales	
	* * * * *	
	MELASTOMACEAE	
	OLINIACEAE	
	RHIZOPHORACEAE	
	COMBRETACEAE	
	MYRTACEAE	
	Myrtales	from Theales
	* * * * *	
	GUTTIFERAE	
	HYPERICACEAE	
	Guttiferales	from Theales
	* * * * *	
	VACCINIACEAE	
	ERICACEAE	
	Ericales	from Theales

Note.—*To be read from below upwards.*

Derivation.

↑	* * * * *	
	HALORRHAGACEAE	
	ONAGRACEAE	
	NYCTAGINACEAE	
	LYTHRACEAE	
	Lythrales	from Caryophyllales
	* * * * *	
	AMARANTACEAE	
	CHENOPODIACEAE	
	PHYTOLACCACEAE	
	Chenopodiales	from Caryophyllales
	ILLECEBRACEAE	
	POLYGONACEAE	
	Polygonales	from Caryophyllales
	PORTULACACEAE	
	FICOIDACEAE	
	MOLLUGINACEAE	
	CARYOPHYLLACEAE	
	ELATINACEAE	
	Caryophyllales	from Ranales
	* * * * *	
	RESEDACEAE	
	Resedales	from Rhoeadales
	* * * * *	
	CRUCIFERAE	
	Cruciales	from Rhoeadales
	* * * * *	
	FUMARIACEAE	
	PAPAVERACEAE	
	Rhoeadales	from Ranales
	* * * * *	
	PIPERACEAE	
	Piperales	from Ranales
	* * * * *	
	HYDNORACEAE	
	CYTINACEAE	
	ARISTOLOCHIACEAE	
	Aristolochiales	from Ranales
	MENISPERMACEAE	
	Berberidales	from Ranales
	NYMPHAEACEAE	
	CERATOPHYLLACEAE	
	RANUNCULACEAE	
	Ranales.	

Phylum II. **Herbaceae.** *Fundamentally and predominantly herbaceous.*

(Climax of Woody Dicotyledons.)

↑	* * * * *	
	VERBENACEAE	
	Verbenales	from Loganiales
	BIGNONIACEAE	
	Bignoniales	from Loganiales
	* * * * *	
	RUBIACEAE	
	Rubiales	from Loganiales
	* * * * *	
	ASCLEPIADACEAE	
	APOCYNACEAE	
	Apocynales	from Loganiales

Note.—To be read from below upwards.

Derivation.

(Climax of Herbaceous Dicotyledons.)

* * * * *

LABIATAE

MYOPORACEAE

Lamiales from Boraginales

BORAGINACEAE

Boraginales from Geraniales

HYDROPHYLLACEAE

Polemoniales from Geraniales

* * * * *

BALSAMINACEAE

OXALIDACEAE

GERANIACEAE

ZYGOPHYLLACEAE

Geraniales from Ranales and/or Caryophyllales

* * * * *

ACANTHACEAE

PEDALIACEAE

GESNERIACEAE

LENTIBULARIACEAE

OROBANCHACEAE

SELAGINACEAE

DIPSACACEAE

VALERIANACEAE

SCROPHULARIACEAE

Personales from Saxifragales

CONVOLVULACEAE

SOLANACEAE

Solanales from Saxifragales

* * * * *

COMPOSITAE

Asterales from Campanulales

* * * * *

LOBELIACEAE

CAMPANULACEAE

Campanulales from Gentianales

* * * * *

UMBELLIFERAE

Umbellales from Saxifragales

* * * * *

PODOSTEMACEAE

HYDROSTACHYACEAE

Podostemonales from Saxifragales

* * * * *

DROSERACEAE

Sarraceniales from Saxifragales

SAXIFRAGACEAE

CRASSULACEAE

Saxifragales from Ranales and Caryophyllales

* * * * *

PLANTAGINACEAE

Plantaginales from Primulales and Gentianales

PLUMBAGINACEAE

PRIMULACEAE

Primulales from Caryophyllales

GENTIANACEAE

Gentianales from Caryophyllales

Note.—*To be read from below upwards.*

Derivation.

* * * * *

TYPHACEAE

Typhales from Liliales
(Parallel with Araceae.)

* * * * *

LEMNACEAE

ARACEAE

Arales from Liliaceae
(Tribe Aspidistreae.)

* * * * *

DIOSCOREACEAE

Dioscoreales from Liliales

PHILESIACEAE

Alstroemeriales from Liliales

SMILACACEAE

PONTEDERIACEAE

TECOPHILAEACEAE

LILIACEAE

Liliales from Butomales

COROLLIFERAE

* * * * *

ZINGIBERACEAE

STRELITZIACEAE

MUSACEAE

Zingiberales from Commelinales
(A climax group parallel with the Orchids.)

* * * * *

ERIOCAULACEAE

Eriocaulales from Commelinales

XYRIDACEAE

Xyridales from Commelinales

FLAGELLARIACEAE

COMMELINACEAE

Commelinales from Butomales and Alismatales

* * * * *

NAJADACEAE

ZANNICHELLIACEAE

Najadales from Alismatales

* * * * *

RUPPIACEAE

POTAMOGETONACEAE

Potamogetonales from Alismatales

* * * * *

ZOSTERACEAE

APONOGETONACEAE

Aponogetonales from Alismatales

JUNCAGINACEAE

Juncaginales from Alismatales

[Alismatales] from Butomales

HYDROCHARITACEAE

Butomales from Ranales

CALYCIFERAE.

MONOCOTYLEDONES



Note.—*To be read from below upwards.*

Derivation.

(Climax of Monocotyledons.)

* * * * *	
GRAMINEAE	
Graminales	from Liliales and probably Commelinales
* * * * *	
CYPERACEAE	
Cyperales	from Juncales
* * * * *	
RESTIONACEAE	
JUNCACEAE	
Juncales	from Liliales
GLUMIFLORAE.	
* * * * *	
ORCHIDACEAE	
Orchidales	from Haemodoraes
BURMANNIACEAE	
Burmanniiales	from Haemodoraes
HYPOXIDACEAE	
VELLOZIACEAE	
HAEMODORACEAE	
Haemodoraes	from Liliales
* * * * *	
PALMAE	
Palmales	from Liliales
AGAVACEAE	
Agavales	from Liliales
* * * * *	
IRIDACEAE	
Iridales	from Liliales
* * * * *	
AMARYLLIDACEAE	
Amaryllidales	from Liliales and Butomales

Chapter XXXIII

FLORA OF THE ZOUTPANSBERG AND BLAAUWBERG

LIST of plants collected by the author and his companions in the **Zoutpansberg** and the **Blaauwberg** mountains, including records by A. A. Obermeijer, H. G. Schweickerdt, I. C. Verdoorn, and C. E. B. Bremekamp.¹

The numbers recorded without initials are those made on my own tour; those of Obermeijer, Schweickerdt, and Verdoorn are abbreviated "O.S. & V.", and Schweickerdt and Verdoorn "S. & V."

LYCOPODIACEAE.

Lycopodium cernuum Linn.—nr. Entabeni, Aug., No. 4360.

MARATTIACEAE.

Marattia fraxinea Sm.—nr. Entabeni, by stream in scrub, Aug., No. 4301.

MARSILEACEAE.

Marsilea ehippiocarpa Alston—nr. Amisfort (S. & V. 628); **M. trichocarpa** Bremek.—Vivo-velei, Bremekamp & Schweickerdt 193.

OSMUNDACEAE.

Osmunda regalis Linn.—nr. Entabeni, Aug., No. 4330.

GLEICHENIACEAE.

Gleichenia linearis C.B. Cl.—nr. Entabeni, epiphyte on tree trunks, nr. the ground, Aug., No. 4259.

POLYPODIACEAE.

Dryopteris Thelypteris (Linn.) A. Gray—foot of Blaauwberg (O.S. & V. 218); **D. Pentheri** (Krass.) C. Christ—kloof nr. Blaauwberg (O.S. & V. 240). **Polystichum Maceleanii** (Bak.) Diels—nr. Entabeni, Aug., No. 4329; **P. adiantiforme** (Forst.) A. Sm.—Hangklip (Bremekamp & Schweickerdt 447). **Asplenium achilleifolium** (Lam.) C. Chr.—nr. Entabeni, epiphyte nr. ground on tree trunks, Aug., No. 4278; **A. splendens** Kze.—nr. Entabeni, on tree trunk at ground level, Aug., No. 4279; **A. Sandersonii** Hook.—Pepiti Falls, 3000 ft., by stream, Aug., No. 4346. **Blechnum australe** Linn.—nr. Entabeni, Aug., No. 4335. **Pityrogramma argentea** (Willd.) Domin—nr. Entabeni, rocky, shady places by stream, leaves white below, Aug., No. 4312. **Pellaea viridis** Prantl—nr. Entabeni, forest in valley, Aug., No. 4203. **Polypodium Schraderi** Mett.—nr. Entabeni, on shaded rocks, Aug., No. 4286; **P. polypodioides** (Linn.) Walt.—nr. Entabeni, Aug., No. 4328. **Elaphoglossum conforme** Sw.—nr. Entabeni, on shaded rock, Aug., No. 4296.

GYMNOSPERMAE.

TAXACEAE.

Podocarpus latifolius R. Br.—Entabeni, rocky places in forest, tree 40 ft., Aug., No. 4283.

¹ This list is not of course complete, because there are many plants in these mountains which have not yet been collected, and some which I have not seen. Nevertheless, the list may prove useful to botanists who still have the good fortune to visit these delectable mountains.

CUPRESSACEAE.

Widdringtonia Whytei Rendle—5 miles W. of Wylie's Poort, steep, rocky places sheltered from fire, dominant, up to 8 ft. high, Aug., No. 4410; Entabeni, steep rocky slopes, tree up to 12 ft., in pure stand, Aug., No. 4334; Hangklip, Bremekamp & Schweickerdt 449.

ANGIOSPERMAE.

DICOTYLEDONES.

Lignosae (Woody Dicotyledons)—to p. 672.

ANNONACEAE.

Artabotrys Monteiroae Oliv.—Pepiti Falls (Obermeyer 1240); **A. brachypetalus** Benth.—upper slopes of Blaauwberg (O.S. & V. 160, 321). **Hexalobus glabrescens** Hutch. & Dalz.—upper slopes of Blaauwberg (O.S. & V. 155, 315).

LAURACEAE.

Cassytha filiformis Linn.—Klein Australe, 3400 ft., in wood, from Aug., No. 4185.

MONIMIACEAE.

Xymalos monospora (Harv.) Baill.—nr. Entabeni, Aug., No. 4229.

EBENACEAE.

Euclea divinorum Hiern—Eyem Farm, N. of Blaauwberg (O.S. & V. 98); **E. Guerkei** Hiern—Elsteg Farm (O.S. & V. 358); **E. Pseudebenus** E. Mey.—N. face of mtns., in *Widdringtonia* scrub, Crewe Farm, Aug., No. 4443; **E. lanceolata** E. Mey.—edge of forest at Entabeni, tree 20 ft., berries green, No. 4209; Elsteg Farm (O.S. & V. 371); **E. multiflora** Hiern—E. of Zoutpan (O.S. & V. 622). **Diospyros mespilliformis** Hochst.—Crewe Farm, 4300 ft., among boulders, small tree, Aug., No. 4426; forest nr. Entabeni, tree 30 ft., fruit green, Aug., No. 4221.

SAPOTACEAE.

Mimusops Zeyheri Sond.—Tshakoma (Obermeijer 1092); Elsteg Farm (O.S. & V. 361a). **Cyrysophyllum magalismontanum** Sond.—Crewe Farm, 4300 ft., among boulders, very small tree, Aug., No. 4425; Klein Australe, in Parinari Wood, 3400 ft., 15 ft., fls. brown, Aug., No. 4188; nr. tops of northern slopes of Blaauwberg, nr. Zoutpan (O.S. & V. 305).

ROSACEAE.

Cliffortia strobilifera L.—Pepiti Falls, by stream, 3000 ft., No. 4347; **C. natalensis** J. M. Wood—nr. Entabeni, steep banks nr. stream; shrub up to 8 ft., Aug., No. 4314; Crewe Farm, 4900 ft., Aug., No. 4431. **Leucosidea sericea** E. & Z.—5 miles W. of Wylie's Poort, 4500 ft., nr. cultivated ground, shrub up to 10 ft., fls. yellow, Aug., No. 4389. **Rubus pinnatus** Willd.—Klein Australe, damp places in Parinari wood, 3400 ft., fruit orange-red, Aug., No. 4181. **Parinari curatellifolia** Planch.—Pepiti Falls, nr. river, tree 20 ft., common in this region, from Aug., No. 4344; **P. mobola** Oliv.—reported by Pole Evans. **Pygeum africanum** Hook f.—forest below Entabeni, rare, tree up to 40 ft., No. 4280.

CAESALPINIACEAE.

Caesalpinia sepiaria Roxb.—N. face of mtns., Crewe Farm, Aug., up to 6 ft., No. 4452; foothills S. of Pepiti Falls, 3000 ft., fls. yellow, common, Aug., No. 4376. **Pterolobium exosum** (Gmel.) Bak. f.—Wylie's Poort (S. & V. 450). **Schotia transvaalensis** Rolfe—edge of mopane veld, 6 miles E. of Fogwell's Paradise, N. Zoutpansberg, tree up to 20 ft., in fruit, Aug., No. 4459. **Peltophorum africanum** Sond.—slopes of mtns. near Zoutpan (O.S. & V. 107). **Bauhinia Galpini** N.E. Br. (*B. punctata* Bolle non Burch.)—Elim, Dec. (Obermeijer). **Pseudocadia zambesiaca** (Bak.) Harms—mtns. nr. Zoutpan (O.S. & V. 65; S. & V. 596). **Burkea africana** Hook.—upper

slopes of mtns. near Zoutpan (O.S. & V. 319). *Copalfera mopane* Kirk—between Waterpoort and Wylie's Poort (O.S. & V. 329). *Cassia delagoensis* Harv.—E. of Zoutpan (S. & V. 563); *C. arachoides* Burch. forma—between Zoutpan and Waterpoort (O.S. & V. 265); 3 miles W. of Zoutpan (S. & V. 642).

MIMOSACEAE.

Acacia caffra Willd.—foothills S. of Pepiti Falls, 3000 ft., tree up to 25 ft., in fruit, Aug., No. 4377; *A. Bentharii* Rochebr.—nr. Zoutpan (S. & V. 470); *A. heteracantha* Burch.—between Zoutpan and Waterpoort (O.S. & V. 150, 274); *A. karroo* Hayne—nr. Zoutpan (O.S. & V. 11); *A. pennata* Willd.—nr. Zoutpan (O.S. & V. 108); *A. permixta* var. *glabra* Burtt Davy—nr. Zoutpan (O.S. & V. 41, 60); *A. senegal* Willd.—nr. Zoutpan (O.S. & V. 300); *A. Woodii* Burtt Davy—nr. Zoutpan (O.S. & V. 12). *Albizzia Rogersii* Burtt Davy—rocky mtn. slopes nr. Zoutpan (O.S. & V. 170; S. & V. 601). *Dichrostachys glomerata* (Forssk.) Chiov.—slopes nr. Zoutpan (O.S. & V. 226). *Elephantorrhiza Burkei* Benth.—N. slopes nr. Zoutpan (O.S. & V. 175).

PAPILIONACEAE.

Psoralea polysticta Benth.—5 miles W. of Wylie's Poort, 5300 ft., shrub up to 3 ft., leaves trifoliate, subsessile, densely gland-dotted, Aug., No. 4406; *P. glabra* var. *latifolia* B. Davy—Entabeni, nr. the top of the ridge on edge of forest, shrub 12 ft., fls. blue, Aug., No. 4192; 5 miles W. of Wylie's Poort, 4900 ft., up to 8 ft., fls. blue, Aug., No. 4403. *Lonchocarpus capassa* Rolfe—between Zoutpan and mtns. (O.S. & V. 8). *Pterocarpus rotundifolius* (Sond.) Druce—Elim, Dec. (Obermeijer 746). *Calpurnia subdecandra* (L'Hérit.) Schweickerdt—Elsteg Farm (O.S. & V. 353). *Indigofera circinnata* Benth.—between Zoutpan and Waterpoort (O.S. & V. 275); *I. flavicans* Bak.—East of Zoutpan (O.S. & V. 296; S. & V. 549); *I. Holubii* N.E. Br.—nr. Zoutpan (S. & V. 480, 544); *I. tettensis* Klotzsch—nr. Zoutpan (S. & V. 487); *I. Obermeijeri* Bremek.—Entabeni (Obermeijer 1112); *I. sanguinea* N.E. Br.—9 miles S.E. of Louis Trichardt, 3000 ft., fls. brick-red, Aug., No. 4152; nr. Entabeni, fls. deep crimson, No. 4240; *I. egens* N.E. Br.—Crew Farm, W. Zoutpansberg, 4300 ft., shrub up to 5 ft., fls. dull red, Aug., No. 4417; upper slopes of Blaauwberg (O.S. & V. 307); *I. subcorymbosa* var. *Eylesii* Bak. f.; above Louis Trichardt, Dec., shrub 5 ft., No. 2014. *Tephrosia grandiflora* Pers.—N. of Pepiti Falls, in cleared Parinari wood, 3800 ft., scrambling, fls. carmine, Aug., No. 4362; *T. zombensis* Baker—Pepiti Falls, shrub 5 ft., fruits densely clustered, hirsute, Aug., No. 4342; *T. capensis* (Thunb.) Pers.—lower slopes of mtns. near Zoutpan (S. & V. 531); *T. purpurea* Pers.—E. of Zoutpan (S. & V. 543); *T. euchroa* Verdoorn—Zoutpan Farm and mtns. nr. (O.S. & V. 73; S. & V. 529); *T. zoutpansbergensis* Bremek—Zoutpan (Bremekamp 279; O.S. & V. 174); *T. elongata* E. Mey.—nr. Entabeni, stony, open places, fls. brownish-yellow, Aug., No. 4322. *Lotononis angolensis* Welw.—2 miles W. of Goede Hoop, 3000 ft., marshy place, lately burnt, fls. yellow, No. 4157; the first record for the Transvaal; *L. Bainesii* Bak.—Zoutpan (O.S. & V. 235); *L. angolensis* Welw.—2 miles W. of Goede Hoop, 3000 ft., fls. yellow, Aug., No. 4157. *Crotalaria inhabilis* Verdoorn—10 miles E. of Waterpoort (O.S. & V. 323); *C. capensis* Jacq.—Crew Farm, forest on S. side of mtns., 5200 ft., shrub up to 3 ft., No. 4440; *C. australis* Bak. f.—Valdezia (Obermeijer 1140); *C. Schinzii* Bak. f.—nr. Zoutpan (S. & V. 580). *Argyrobolium transvaalense* Schinz—Elsteg Farm (O.S. & V. 351); *A. tomentosum* Burtt Davy (*Cytisus tomentosus* Andr.) *A. Andrewsiana* Steud.—between Klein Australe and Entabeni, 3800 ft., shrub with yellow fls., No. 4191. *Lotus discolor* E. Mey.—nr. Entabeni, fls. cream, Aug., No. 4233. *Eriosema psoraleoides* (Lam.) Don—nr. Zoutpan (S. & V. 594). *Ooptera Burchellii* DC.—N. of Blaauwberg and nr. Zoutpan (O.S. & V. 100). *Dolichos Schlechteri* (Harms) Burtt Davy—nr. Zoutpan (O.S. & V. 185). *Rhynchosia monophylla* Schltr.—below Entabeni, wings crimson, standard striped with crimson, Aug., No. 4246. *R. elivorum* S. Moore—N. of Pepiti Falls, edge of forest, 4400 ft., erect shrub up to 10 ft., fls. yellow, Aug., Nos. 4369, 4388; *R. caribaea* DC.—Klein Australe, 3400 ft., evergreen scrub, climber, fls. yellow, Aug., No. 4168; *R. minima* DC.—nr. Zoutpan (S. & V. 473).

Sphenostylis angustifolia Benth.—nr. Entabeni, stony, open places, fls. crimson, Aug., No. 4321. **Neorautanenlia edulis** C. A. Smith—3 miles W. of Zoutpan, etc. (S. & V. 645; O.S. & V. 81, 183, 271). **Allistilus bechuanicus** N.E. Br.—upper slopes of Zoutpansberg, nr. Zoutpan (O.S. & V. 317). **Syllitra contorta** (N.E. Br.) Bak. f.—nr. Zoutpan (S. & V. 508), between Zoutpan and Waterpoort (O.S. & V. 267). **Sesbania aculeata** Pers.—nr. Zoutpan (S. & V. 454). **Abrus laevigatus** E. Mey.—nr. Zoutpan (O.S. & V. 206). **Glycine javanica** L.—nr. Zoutpan (S. & V. 597). **Aeschynomene leptobotrys** Harms.—Klein Australe, 3400 ft., damp places in Parinari wood, shrub 10 ft., fls. yellow, Aug., No. 4184. **Ormocarpum trichocarpum** (Taub.) Harms.—foot of Zoutpansberg nr. Zoutpan (S. & V. 582). **Stylos-anthes mucronata** Willd.—between Waterpoort and Wylie's Poort (O.S. & V. 336). **Erythrina lysistemon** Hutch.—9 miles S.E. of Louis Trichardt, 3000 ft., tree 50 ft., fls. scarlet, No. 4155.

ESCALLONIACEAE.

Choristylis rhamnoides Harv.—below Entabeni, on edge of forest, shrub 10 ft., fls. greenish-cream, No. 4292; nr. Louis Trichardt, 4500 ft., *Galpin* 9560.

MYROTHAMNACEAE.

Myrothamnus flabellifolia Welw.—Crewe Farm, 4200 ft., sandstone rocks, Aug., No. 4415; on N. slopes nr. Zoutpan (O.S. & V. 171; S. & V. 177).

SALICACEAE.

Salix Wilmsii Seem.—stream banks in Wylie's Poort (O.S. & V. 442).

MORACEAE.

Ficus Pretoriae Burt & Davy—Crewe Farm, small tree, among boulders, 4300 ft., Aug., No. 4422; behind Zoutpan Farm (O.S. & V. 104, 281, 614); **F. natalensis** Hochst.—Crewe Farm, small tree among boulders, 4300 ft., Aug., No. 4423; **F. Sycomorus** L.—foot of mtn. nr. Zoutpan (S. & V. 593); **F. Burkei** Miq.—Palmary Ville, 2500 ft., large tree on Miss de Kocker's Farm, Aug., No. 4339; **F. capensis** Thunb.—kloof behind Zoutpan Farm (O.S. & V. 350); **F. Sonderi** Miq.—nr. Zoutpan (O.S. & V. 230; S. & V. 560); Wylie's Poort, rocky slopes by roadside (S. & V. 669); **F. Smutsii** Verdoorn—Zoutpan, lower slopes of mtn. (S. & V. 600); **F. soldanella** Miq.—nr. Zoutpan (O.S. & V. 280; S. & V. 371).

ULMACEAE.

Trema guineensis Ficalho—Elsteg Farm, 6 miles W. of Louis Trichardt (O.S. & V. 350). **Celtis Kraussiana** Bernh.—below Entabeni, in forest, tree 20 ft., Aug., No. 4244.

URTICACEAE.

Pouzolzia hypoleuca Wedd.—Wylie's Poort, along streams (O.S. & V. 337).

FLACOURTIACEAE.

Aphloia myrtiflora Galpin—nr. Entabeni, edge of forest, tree 20 ft., fls. white, 4000 ft., No. 4210, 4226. (*Obermeijer* 1107).—Shewass (*Legat* 14). **Dovyalis lucida** Sim—Entabeni (*Obermeijer* 891). **Trimeria rotundifolia** (Hochst.) Gilg—Entabeni, Dec. (*Obermeijer* 862); Elsteg Farm (O.S. & V. 354).

THYMELAECEAE.

Passerina montana Thode—Pepiti Falls (*Obermeijer*); Hangklip, *Bremekamp & Schweickerdt* 417; shrub up to 9 ft., used for making brooms, nr. stream on rocks, Entabeni, Aug., No. 4308. **Lasiosiphon caffer** var. **pulcher** B. Davy—below Entabeni, grassy rocky places, fls. lemon-yellow, sweet-scented, Aug., No. 4254; **L. canoargentea** C. H. Wright—Pepiti Falls, among grass nr. river, 3000 ft., fls. yellow, Aug., No. 4345. **Peddiea africana** Harv.—Pepiti Falls, 3000 ft., by stream, shrub up to 12 ft., calyx-tube dull red, limb green, Aug., No. 4348.

PROTEACEAE.

Protea abyssinica Willd.—5 miles W. of Wylie's Poort, 4800 ft., grassy places, up to 8 ft., fls. white or pale pink, fairly common, Aug., No. 4411; **P. Roupelliae** Meisn.—5 miles W. of Wylie's Poort, 5000 ft., up to 20 ft., fls. pink, very fine, Aug., No. 4413.

PITTOSPORACEAE.

Pittosporum viridiflorum Sims—5 miles W. of Wylie's Poort, rocky places, fruit Aug., No. 4396a.

CAPPARIDACEAE.

Cadaba Breyeri Burt. Davy—lower Nwanedzi, N. Zoutpansberg (*Breyer*); **C. termitaria** N.E. Br.—nr. Zoutpan (O.S. & V. 34, 286). **Cleome diandra** Burch.—slopes of Blaauwberg (S. & V. 612). **Capparis tomentosa** Lam.—nr. Zoutpan (O.S. & V. 13). **Boscia Rehmanniana** Pest. forma—N. of Zoutpan (O.S. & V. 182a). **B. albitrunca** Gilg & Bened.—between Zoutpan and Waterpoort (O.S. & V. 276). **Courbonia glauca** (Kl.) Gilg & Bened.—between Waterpoort and Wylie's Poort (O.S. & V. 328); between Zoutpan and Waterpoort (O.S. & V. 247). **Maerua maschonica** Gilg. N. of Zoutpan (O.S. & V. 43); **M. Legatii** Burt. Davy—same loc. (O.S. & V. 182).

POLYGALACEAE.

Muraltia saxicola Chod.—5 miles W. of Wylie's Poort, 4800 ft., rocky, bushy places, Aug., No. 4395. **Polygala producta** N.E. Br.—Pepiti Falls, scrubby places, 3000 ft., Aug., No. 4356; **P. speciosa** Sims—Wylie's Poort, fls. carmine, June, No. 3202; **P. amatymbica** Eckl. & Zeyh.—nr. Entabeni, fls. purple, Aug., No. 4237.

TURNERACEAE.

Piriqueta capensis (Harv.) Urb.—between Waterpoort and Wylie's Poort (O.S. & V. 339).

PASSIFLORACEAE.

Adenia repanda (Burch.) Engl.—between Zoutpan and Waterpoort (O.S. & V. 246); Vivo, *Bremekamp & Schweickerdt* 206.

CUCURBITACEAE.

Corallocarpus sphaerocarpus var. **scaberrimus** Cogn.—Zoutpan (O.S. & V. 30). **Momordica Balsamina** Linn.—Blaauwberg (O.S. & V. 14). **Citrullus Naudinianus** (Sond.) Hook. f.—W. of Zoutpan (S. & V. 646); **C. vulgaris** Schrad.—Zoutpan (S. & V. 455). **Cucumis africanus** L.f. var. **Zeyheri** B. Davy—nr. Blaauwberg (O.S. & V. 213); **C. hirsutus** Sond.—N. of Blaauwberg (O.S. & V. 85, 245); between Zoutpan and Waterpoort (O.S. & V. 258). **Coccinia Rehmanniana** Cogn.—Blaauwberg (O.S. & V. 40); **C. sessilifolia** (Sond.) Cogn.—N. of Blaauwberg (O.S. & V. 91).

TILIACEAE.

Corchorus pongolensis Burt. Davy & Greenway—Wylie's Poort, 3 ft., Aug., No. 3226; nr. Zoutpan (O.S. & V. 67); **C. asplenifolius** Burch.—E. of Zoutpan (S. & V. 536, 541). **Grewia flava** DC.—nr. Zoutpan (O.S. & V. 56); **G. hexamita** Burret—nr. Zoutpan (O.S. & V. 149); **G. setinervis** Burret—nr. Zoutpan (O.S. & V. 2, 244); **G. occidentalis** L.—Wylie's Poort (O.S. & V. 341); **G. Schweickerdtii** Burret—nr. Zoutpan (O.S. & V. 120).

STERCULIACEAE.

Melhanlia Rehmannii Szyszyl.—nr. Zoutpan (O.S. & V. 188a). **Hermannia boraginiflora** Hook.—nr. Zoutpan (O.S. & V. 142; S. & V. 562); **H. Holubii** B. Davy—nr. Vivo (S. & V. 652; S. & V. 484); **H. grisea** Schinz—nr. Zoutpan (S. & V. 553); **H. depressa** N.E. Br.—5 miles S.E. of Louis Trichardt, fls. dull pink, Aug., No. 4149. **Waltheria americana** var. **indica** K. Schum.—nr. Zoutpan (O.S. & V. 554). **Sterculia Rogersii** N.E. Br.—nr. Zoutpan (O.S. & V. 87). **Dombeya rotundifolia** Harv.—nr. Palmerville, 3000 ft., tree 20 ft., leafless at flowering time, fls. white, Aug., No. 4378.

BOMBACACEAE.

Adansonia digitata Linn.—N. slopes nr. Zoutpan (O.S. & V. 69). Numerous examples observed by us on N. slopes west of N. entrance to Wylie's Poort.

MALVACEAE.

Pavonia Meyeri Mast.—Klein Australe, 3400 ft., damp places, 5 ft., fls. pink, Aug., No. 4173. **Hibiscus micranthus** L.—nr. Zoutpan (O.S. & V. 195; S. & V. 504); **H. dongolensis** DC.—N. slopes nr. Zoutpan (S. & V. 575a); **H. physaloides** Guill. & Perrot.—nr. Zoutpan (O.S. & V. 25); **H. praeteritus** R.A. Dyer—E. of Zoutpan (S. & V. 575); between Zoutpan and Waterpoort (O.S. & V. 257); N. end of Wylie's Poort, Dec., No. 2045, 2080 (O.S. & V. 338); **H. intermedius** A. Rich. var. **aristaevalvis** Guerke—nr. Zoutpan (O.S. & V. 32; S. & V. 476). **Gossypium africanum** Watt—E. of Zoutpan (O.S. & V. 135; S. & V. 564). **Abutilon austroafricanum** Hochr.—nr. Zoutpan (O.S. & V. 144; S. & V. 558); between Zoutpan and Waterpoort (O.S. & V. 270). **Sida cordifolia** L.—nr. Zoutpan (O.S. & V. 234; S. & V. 556); **S. flexuosa** B. Davy—between Zoutpan and Waterpoort (O.S. & V. 253); **S. Hoepfneri** Guerke—nr. Zoutpan (O.S. & V. 148). **Pavonia Burchellii** (DC.) R.A. Dyer nr. Zoutpan (O.S. & V. 189; S. & V. 506); **P. dentata** B. Davy—nr. Zoutpan (O.S. & V. 126, 167); Wylie's Poort, on rocks (S. & V. 671).

EUPHORBIACEAE.

Croton megalobotrys Müll. Arg. (*C. tubouga* S. Moore) (see figure, p. 390)—forest below Entabeni, tree up to 40 ft., deciduous, Aug., No. 4293; nr. Zoutpan (O.S. & V. 4, 106); **C. gratissimus** Burch.—N. slopes nr. Zoutpan (O.S. & V. 157, 169). **C. pseudopulchellus** Pax—upper slopes nr. Zoutpan (O.S. & V. 303, 316). **Cluytia affinis** Sond.—Entabeni, margin of forest, 4000 ft., shrub 3 ft., leaves turning red, Aug., No. 4204; **C. pulchella** var. **obtusata** Sond.—Elsteg Farm (O.S. & V. 366); **C. Galpinii** Pax—Crewe Farm, shrub 2 ft., fls. yellow, Aug., No. 4446. **Phyllanthus Kirkianus** Müll. Arg.—nr. Entabeni, fls. cream, Aug., No. 4236; **P. reticulatus** Poir.—E. of Zoutpan (S. & V. 620). **Micrococca capensis** Prain—Entabeni, shrub up to 5 ft., in forest, Aug., No. 4261; Dec. (*Obermeijer* 867). **Bridelia mierantha** Baill.—Elin, Dec. (*Obermeijer* 569); **B. mollis** Hutch.—nr. Zoutpan, in kloof and on N. slopes of Zoutpansberg (O.S. & V. 243; S. & V. 599b). **Pseudolachnostylis maprouneifolia** Pax—N. slopes of mtns. nr. Zoutpan (O.S. & V. 74, 75, 117). **Fluggea virosa** Baill.—nr. foot of mtns. nr. Zoutpan (O.S. & V. 6, 10; S. & V. 521). **Androstachys Johnsonii** Prain—Wylie's Poort (O.S. & V. 327). **Acalypha glabrata** Thunb.—Elsteg Farm (O.S. & V. 348); **A. indica** L.—E. of Zoutpan (S. & V. 535). **Tragia Okanyua** Pax—N. slopes nr. Zoutpan (O.S. & V. 283). **Plukenetia africana** Sond.—E. of Zoutpan (S. & V. 552). **Jatropha erythropoda** Pax & K. Hoffm.—nr. Zoutpan (O.S. & V. 194, 262); **J. Zeyheri** Sond.—Eyem Farm, N. of Blaauwberg (O.S. & V. 101). **Spirostachys africana** Sond.—nr. Zoutpan (O.S. & V. 35, 77). **Euphorbia aeruginosa** Schweickerdt—N. slopes nr. Zoutpan (O.S. & V. 151; S. & V. 688); **E. Cooperi** N.E. Br.—nr. Zoutpan (S. & V. 649); **E. Gürichiana** Pax—nr. Zoutpan (O.S. & V. 178; S. & V. 513); **E. epicyparissias** E. Mey.—Pepiti Falls, 3000 ft., scrubby places, Aug., No. 4353; **E. tirucalli** L.—Wylie's Poort (S. & V. 676); **E. transvaalensis** Schltr.—Wylie's Poort (O.S. & V. 369); **E. caerulescens** Harv.—Crewe Farm, 4800 ft., up to 8 ft. on N. face of mtn., Aug., No. 4454. **Mona-denium Lugardae** N.E. Br.—nr. Zoutpan (S. & V. 648).

OCHNACEAE.

Ochna O'Connori Phill.—Pepiti Falls (*Obermeijer*); **O. atropurpurea** DC.—nr. tops of mtns. nr. Zoutpan (O.S. & V. 312); **O. Holstii** Engl.—nr. Entabeni, tree 40 ft., wood very hard, in forest, Aug., No. 4269; **O. arborea** Burch.—Pepiti Falls, nr. the stream, shrub 8 ft., fruits red, No. 4355.

ERICACEAE.

Erica cerinthoides Linn.—Crewe Farm, 4300 ft., small tree with red fls., Aug., No. 4430; mtn. sides W. of Wylie's Poort, Aug., No. 4382.

VACCINIACEAE.

Vaccinium exsul Bolus—Crewe Farm, W. Zoutpansberg, 5400 ft., among *Wid-dringtonia*, up to 3 ft., Aug., No. 4436; nr. Entabeni, in wood on rocky slope by stream, not in fl., Aug., No. 4305.—See p. 351.

MYRTACEAE.

Eugenia natalitia Sond.—nr. Sibasa (*Obermeijer* 1245); Pepiti Falls, 3000 ft., nr. stream, from Aug., No. 4351. **Syzygium cordatum** Hochst.—Pepiti Falls, nr. the river, 3000 ft., small tree, Aug., No. 4343; nr. Zoutpan (O.S. & V. 63); **S. Fourcadei** B. Davy—forest nr. Entabeni, Aug., Nos. 4304, 4337; **S. Legatii** B. Davy & Greenway—Crewe Farm, 4300 ft., small tree, common in the W. Zoutpansberg, Aug., Nos. 4327, 4393, 4398, 4429; Lake Fundusi, *Bremekamp & Schweickerdt* 363.

MELASTOMACEAE.

Dissothis princeps Triana—below Entabeni, margin of forest, 10 ft. high, fls. magenta, Aug., No. 4287.

COMBRETACEAE.

Combretum paniculatum Vent.—mtn. 5 miles W. of Wylie's Poort, 4500 ft., in evergreen scrub, Aug., No. 4379a; **C. holosericeum** Sond., Crewe Farm, from Aug., No. 4450; **C. Kraussii** Hochst.—forest below Entabeni, up to 40 ft., common, Aug., No. 4262; Crewe Farm, No. 4421; **C. apiculatum** Sond.—nr. Zoutpan (S. & Z. 603); **C. mossambicense** (Klotzsch) Engl.—nr. Zoutpan (O.S. & Z. 143). **Terminalia sericea** Burch.—Elim, Dec. (*Obermeijer*); nr. Zoutpan (O.S. & V. 1); **T. prunioides** Laws—nr. Zoutpan (O.S. & V. 191); **T. Rautanenii** Schinz—nr. Zoutpan (O.S. & V. 83).

RHIZOPHORACEAE.

Cassipourea Gerrardii (Schinz) Alston—forest below Entabeni, shrub, not in fl., No. 4268.

HYPERICACEAE.

Hypericum aethiopicum var. **glaucescens** Sond.—nr. Entabeni, common, Aug., No. 4238; **H. Lalandii** Choisy—nr. Zoutpan (O.S. & V. 204); **H. lanceolatum** Lam.—nr. Entabeni, edge of forest, 4000 ft., shrub 4 ft., fls. yellow, Aug., No. 4200.

GUTTIFERAE.

Garcinia Livingstonei T. And.—Crewe Farm, among boulders, 4300 ft., dwarf shrub, not in fl., Aug., No. 4427. Elstog Farm (O.S. & V. 354).

OLINIACEAE.

Olinia usambarensis Engl.—Entabeni (*Obermeijer* 1216).

CELASTRACEAE.

Gymnosporia procumbens Loes.—Crewe Farm, W. Zoutpansberg, 4400 ft., small shrub, Aug., No. 4420; **G. rubra** Harv.—Entabeni (*Obermeijer*); **G. Harveyana** Loesn.—nr. Entabeni, shrub 8 ft., Aug., No. 4216; **G. acuminata** (L.) Szysz.—nr. Entabeni, Aug., No. 4260. **Cassine Schlechteri** (Loes.) Davison—nr. Zoutpan (O.S. & V. 237; S. & V. 576, 577); **C. capensis** Linn.—5 miles W. of Wylie's Poort, 4800 ft., fls. cream, Aug., No. 4400. **Pterocelastrus tricuspidatus** Sond.—nr. Entabeni, Aug., No. 4290; **P. echinatus** N.E. Br.—5 miles W. of Wylie's Poort, 2 ft., berries red, Aug., Nos. 4397, 4409. **Catha edulis** Forssk.—N. of Pepiti, among *Parniari*, 20 ft. high, Aug., No. 4374.

HIPPOCRATEACEAE.

Hippocratea longipetiolata Oliv.—Waterpoort (*Bremekamp & Schweickerdt* 290); between Zoutpan and Waterpoort (O.S. & V. 254).

SALVADORACEAE.

Salvadora australis Schweickerdt—nr. Zoutpan, on N. slopes (O.S. & V. 18).

OLACACEAE.

- Olax dissitiflora** Oliv.—N. slopes nr. Zoutpan (O.S. & V. 153, 236). **Ximenia americana** var. **microphylla** Welw. ex Oliv.—foot of mtn. nr. Zoutpan (O.S. & V. 111; S. & V. 530); **X. caffra** Sond.—nr. Zoutpan (O.S. & V. 5, 295). **Apodytes dimidiata** E. Mey.—nr. Entabeni, tree 40 ft., Aug., No. 4282. **Pyrenacantha scandens** Harv.—Tshakoma (*Obermeijer*).

LORANTHACEAE.

- Loranthus kalachariensis** Schinz.—3 miles E. of Fogwell's Paradise, N. Zoutpansberg, on *Acacia* in deciduous scrub, fls. crimson, Aug., No. 4458; nr. Zoutpan (S. & V. 517); **L. Breyeri** Bremekamp—N. of Zoutpan, on *Acacia* (O.S. & V. 52); **L. Dregei** Eckl. & Zeyh. var. —N. of Zoutpan, on *Acacia* (O.S. & V. 17, 47); **L. oleaeifolius** var. **Leendertziae** Sprague—N. slopes nr. Zoutpan (O.S. & V. 282). **Viscum anceps** E. Mey.—3 miles E. of Fogwell's Paradise, on *Pseudolachnostylis*, in deciduous scrub, fruit green, Aug., No. 4457; **V. combreticola** Engl.—mtns. nr. Zoutpan (O.S. & V. 166, 311); **V. nervosum** Hochst. —nr. Entabeni, on *Rapanea melanophloeos*, berries yellowish-green, Aug., No. 4219; **V. verrucosum** Harv. —nr. margin of Zoutpan, on *Acacia* (S. & V. 492).

SANTALACEAE.

- Thesium disparile** N.E. Br.—5 miles W. of Wylie's Poort, 4800 ft., Aug., No. 4407.

RHAMNACEAE.

- Rhamnus prinoides** L'Hérit.—nr. Entabeni, edge of forest, shrub 10 ft., berries dull red, 4000 ft., No. 4215. **Berchemia discolor** (Klotzsch) Hemsl.—N. slopes nr. Zoutpan (O.S. & V. 278, 279). **Zizyphus mucronata** Willd.—between Waterpoort and Wylie's Poort (O.S. & V. 326). **Colubrina asiatica** Brogn.—Lake Fundusi (Bremekamp & Schweickerdt 372).

AMPELIDACEAE.

- Rhoicissus digitata** Gilg & Benodict —nr. Entabeni, edge of forest, Aug., No. 4306; **R. erythroides** Fresen.—Klein Australe, 3400 ft., in evergreen scrub, Aug., No. 4169; **R. rhomboidea** Planch.—nr. Entabeni, edge of forest, Aug., No. 4300. **Cissus lonicerifolius** C. A. Smith—Eyem Farm (O.S. & V. 96); **C. quadrangularis** L.—between Zoutpan and Waterpoort (O.S. & V. 261); **C. simulans** C. A. Smith—Elsteg Farm (O.S. & V. 361); **C. unguiformifolius** C. A. Smith—between Waterpoort and Wylie's Poort (O.S. & V. 330).

MYRSINACEAE.

- Rapanea melanophloeos** Mez—Entabeni (*Obermeijer* 1110); same loc., 4000 ft., Aug., fls. cream, reddish outside, No. 4218. **Maesa lanceolata** Forssk.—edge of forest nr. Entabeni, 4000 ft., tree 10 ft., berries pale yellow, Aug., No. 4212; nr. Zoutpan (O.S. & V. 113). **Myrsine africana** L.—edge of forest nr. Entabeni, 4000 ft., shrub, fl.-buds reddish, No. 4207.

CORNACEAE.

- Curtisia faginea** Ait. *Hort Kew.* 1 : 162 (1789); *Harr. Thes.* 2 : 16, 5. 124. Wang. in *Engl. Pflanzenr.* 4, 229 : 30, fig. 4. Nr. Entabeni, in forest, tree up to 20 ft., Aug., No. 4220; 5 miles W. of Wylie's Poort, 4800–5300 ft., the commonest tree in evergreen scrub, from Aug., No. 4408. Tschakoma (*Obermeijer* 1170).

ARALIACEAE.

- Cussonia umbellifera** Sond.—forest at Entabeni, tree 35 ft., stem 11 ft. in circumference, berries greyish-green, Aug., No. 4222; **C. spicata** Thunb.—Wylie's Poort, small tree, 20 ft., June, No. 3209.

RUTACEAE.

- Toddalia aculeata** Lam.—Elim, fruit Dec. (*Obermeijer* 924). **Toddalopsis Bremekampii** Verdoorn—nr. Zoutpan (O.S. & V. 66, 156; S. & V. 567). **Fagara capensis** Thunb.—Elsteg Farm, 6 miles W. of Louis Trichardt (O.S. & V. 346, 347). **Clausena anisata** (Willd.) Hook. f.—Elsteg Farm, 6 miles W. of Louis Trichardt (O.S. & V. 356). **Calodendron capense** Thunb.—Entabeni (*Obermeijer* 1248).

SIMARUBACEAE.

Kirkia pubescens B. Davy—N. slopes of Zoutpansberg nr. Zoutpan (O.S. & V. 163).

BURSERACEAE.

Commiphora pyracanthoides Engl.—N. of Zoutpan (O.S. & V. 48, 49, 159; S. & V. 512); **C. Marlothii** Engl.—nr. Zoutpan (O.S. & V. 121, 165); **C. calcicola** Engl.—nr. Zoutpan (O.S. & V. 180; S. & V. 511); **C. cinerea** Engl.—nr. Zoutpan (O.S. & V. 152).

MELIACEAE.

Trichilia emetica Vahl—Tshakoma (Obermeijer 985); **T. pterophylla** C. DC.—Crewe Farm, up to 3 ft., fruit red, Aug., No. 4448. **Ekebergia capensis** Sparrm.—Elim (Obermeijer 29,292); **E. Meyerii** Presl.—nr. Zoutpan (O.S. & V. 112). **Entandrophragma caudatum** Sprague—N. slopes nr. Zoutpan (O.S. & V. 306). **Ptaeroxylon obliquum** (Thunb.) Radlk.—nr. Zoutpan (O.S. & V. 118).

SAPINDACEAE.

Allophyllus melanocarpus Radlk.—Tschakoma (Obermeijer). **Cardiospermum alatum** Bremekamp and Obermeijer—E. of Zoutpan (S. & V. 559).

ANACARDIACEAE.

Rhus tomentosa Linn.—5 miles W. of Wylie's Poort, in rocky places, 4900 ft., Aug., No. 4396; **R. incana** Mill.—forest below Entabeni, shrub 10 ft., No. 4284; **R. Gueinzii** Sond.—nr. Zoutpan (O.S. & V. 231); **R. pyroides** var. **gracilis** B. Davy—nr. Zoutpan (O.S. & V. 222); **R. transvaalensis** Engl.—Elsteg (O.S. & V. 365); **R. Rehmanniana** Engl.—N. of Pepiti, 3200 ft., Aug., No. 4373.

CONNARACEAE.

Cnestis natalensis Planch. & Sond.—Entabeni (Obermeijer 1119).

LOGANIACEAE.

Strychnos spinosa Lam.—Tshakoma (Obermeijer 1060); **S. Schumanniana** Gilg.—nr. Zoutpan (O.S. & V. 64); **S. innocua** Del.—nr. Zoutpan (O.S. & V. 161). **Buddleja salvifolia** L.—1 mile W. of Wylie's Poort, fls. pale blue, Aug., No. 4455. **Anthocleista zambesiaca** Bak.—nr. Zoutpan (O.S. & V. 115). **Lachnopylis montana** C. A. Smith—Elsteg Farm, 6 miles W. of Louis Trichardt (O.S. & V. 344); **L. schistotricha** C. A. Smith—nr. Entabeni, in forest, tree up to 30 ft., fls. white, leaves stellate-pubescent below, Aug., No. 4208; **L. emarginata** (Sond.) C. A. Smith—Crewe Farm, 5200 ft., N. face of mtn., among rocks, Aug., shrub up to 5 ft., No. 4449 (probably not distinct from *L. montana*). **Nuxia floribunda** Benth.—nr. Entabeni, on edge of forest, tree 30 ft., Aug., No. 4214.

EHRETACEAE.

Ehretia amoena Klotzsch; *E. rigida* (Thunb.) Druce—nr. Zoutpan (O.S. & V. 44, 45); Elim, fruit Dec. (Obermeijer 828). **Cordia ovalis** R. Br.—nr. Zoutpan (O.S. & V. 192).

OLEACEAE.

Olea laurifolia Lam.—Crewe Farm, among boulders, not in fl., Aug., No. 4428. **Jasminum stenolobum** Rolfe—Eyem Farm, N. of Blaauwberg (O.S. & V. 92).

APOCYNACEAE.

Conopharyngia elegans Stapf—Tshakoma (Obermeijer 1169). **Carlissa arduina** L.—forest below Entabeni, shrub, from Aug., Nos. 4271, 4288, 4230. **Landolphia Kirkii** Dyer var. **delagoense** Dew.—upper slopes of Zoutpansberg, nr. Zoutpan (O.S. & V. 172, 304). **Pachypodium Saundersii** N.E. Br.—Wylie's Poort (S. & V. 668). **Strophanthus Gerrardii** Stapf—W. of Zoutpan (S. & V. 579).

ASCLEPIADACEAE.

Pachycarpus inconstans N.E. Br.—nr. Louis Trichardt, Dec., No. 2030. **Asclepias physocarpa** Schltr.—Entabeni (Obermeijer 1218); **A. curassavica** Linn.—

Tshakoma (*Obermeijer* 1108); **A. Burchellii** Schltr.—nr. Zoutpan (O.S. & V. 23). **Schizoglossum cordifolium** E. Mey.—Klein Australe, 3400 ft., on bare hillsides, Aug., No. 4187. **Gymnema sylvestre** R. Br.—Zoutpan (*Bremekamp* and *Schweickerdt* 285). **Cryptolepis obtusa** N.E. Br.—nr. Zoutpan (S. & V. 591). **Secamone Gerrardii** Harv.—Elsteg Farm (O.S. & V. 352); **S. zambesiaca** var. **parvifolia** N.E. Br.—nr. Zoutpan (O.S. & V. 138); **S. alpinii** Schultes—Entabeni, climber in forest, from Aug., No. 4285. **Stomatostemma Monteiroae** (Oliv.) N.E. Br.—nr. Zoutpan (O.S. & V. 320). **Ceropegia cimiciflora** Obermeijer—between Waterpoort and Zoutpan (O.S. & V. 322).—**Tavaresia grandiflora** (K. Schum.) Berger—between Waterpoort and Zoutpan (O.S. & V. 413). **Caralluma atrosanguinea** N.E. Br.—between Zoutpan and Waterpoort (S. & V. 446); **C. Schweickerdtii** Obermeijer—between Zoutpan and Waterpoort (O.S. & V. 411); **C. maculata** N.E. Br.—nr. Waterpoort (S. & V. 660). **Stapelia clavicorona** Verdoorn—Wylie's Poort (S. & V. 414); **S. Getleffii** Pott—nr. Zoutpan (S. & V. 477); between Zoutpan and Waterpoort (S. & V. 444); **S. gigantea** N.E. Br.—nr. Zoutpan (O.S. & V. 70); **S. nobilis** N.E. Br.—nr. Zoutpan (S. & V. 445); **S. kwebensis** N.E. Br.—Vivo, W. of Zoutpan (O.S. & V. 406); between Zoutpan and Waterpoort (S. & V. 662). **Heurnia zebrina** N.E. Br. var. **magniflora** Phillips—between Zoutpan and Waterpoort (O.S. & V. 416; S. & V. 443, 457, 658, 659). **Pergularia extensa** (Jacq.) N.E. Br.—nr. Zoutpan (O.S. & V. 3, 90). **Fockea angustifolia** K. Schum.—nr. Zoutpan (O.S. & V. 187).

RUBIACEAE.

Gardenia Neuberia Eckl. & Zeyh.—Wylie's Poort (S. & V. 667); **G. spatulifolia** Stapf & Hutch.—N. slopes nr. Zoutpan (O.S. & V. 158). **Randia rudis** E. Mey.—nr. Entabeni, Aug., No. 4228. **Oxyanthus Gerrardii** Sond.—forest below Entabeni, up to 20 ft., Aug., No. 4272. **Pavetta Harbori** S. Moore—between Zoutpan and Waterpoort (O.S. & V. 255); **P. Schumanniana** F. Hoffm. ex K. Schum.—Elsteg Farm (O.S. & V. 357); **P. canescens** DC.—Elin and Tshakoma (*Obermeijer*). **Tricalysia capensis** Meisn.—nr. Entabeni, 12 ft., Aug., No. 4275. **T. lanceolata** Sond.—5 miles W. of Wylie's Poort, evergreen, shrub on rocks, 4600 ft., Aug., No. 4401. **T. griseifolia**—Pepiti Falls, in forest nr. the river, tree up to 20 ft. high, Aug., No. 4358. **Tricalysia jasminiflora** Hook.—nr. Louis Trichardt, among rocks, shrub 6 ft., fls. white, *Galpin* 9557. **T. pachystigma** K. Schum.—2 miles W. of Goede Hoop, 3000 ft., in evergreen scrub, fls. white, Aug., No. 4166; nr. Entabeni, 4 ft., berries dull orange, Aug., Nos. 4211, 4311. **Empogona Kirkii** Hook. f. var. **australis** Schweickerdt—nr. Zoutpan (O.S. & V. 72; S. & V. 528). **Vangueria tomentosa** Hochst.—N. slopes nr. Zoutpan (S. & V. 691); **V. cyanescens** Robyns—N. slopes nr. Zoutpan (O.S. & V. 102). **Canthium ventosum** (L.) S. Moore—below Entabeni, in forest, not in fl., Aug., No. 4277; Elsteg Farm (O.S. & V. 359); **C. huillense** Hiern—nr. Zoutpan (O.S. & V. 122, 173); **C. Gueinzii** Sond. (Syn. *Keetia transvaalensis* Phill.), Entabeni (*Obermeijer* 859), 4357; **C. hispidum** Linn.—nr. Entabeni, shrub 12 ft., Aug., No. 4274; **C. ciliatum** (*Plectronia ciliata* Sond.)—shrub with axillary spines and ciliate leaves, forest below Entabeni, Aug., No. 4291. **Plectroniella armata** (K. Schum.) Robyns—nr. Zoutpan (O.S. & V. 26). **Psychotria capensis** Sond.—Entabeni, edge of forest, shrub 10 ft., fruit dark green, common, Aug., Nos. 4223, 4266, 4267; 5 miles W. of Wylie's Poort, on rocks, 4600 ft., Aug., No. 4399. **Cephalanthus natalensis** Oliv.—Klein Australe, in evergreen forest, shrub 10 ft., fls. greenish, Aug., No. 4170. **Adina microcephala** Hiern—Pepiti Falls, 3000 ft., nr. river, tree up to 30 ft., Aug., No. 4359. **Oldenlandia rupicola** (Sond.) O. Ktze.—N. of Pepiti Falls, beneath rocks, fls. white, No. 4364; Crewe Farm, on rocks, Aug., No. 4432; **O. macrophylla** DC.—Valdezia (*Obermeijer* 1140); **O. natalensis** (Hochst.) O. Ktze.—nr. Entabeni, among grass, fls. blue, Aug., No. 4199; **O. zoutpansbergensis** Bremek.—Ngelele Valley (*Bremekamp* 320); **O. cephalotes** (Hochst.) O. Kuntze—nr. Zoutpan (O.S. & V. 201); **O. decumbens** (Hochst.) Hiern.—nr. Zoutpan (S. & V. 592); **O. setifera**—5 miles S.E. of Louis Trichardt, fls. reddish-mauve or dirty white, Aug., No. 4150. **Otiophora calycophylla** (Sond.) Hutch., comb. nov. (*Anthospermum calycophyllum* Sond. *O. cupheoides* N.E. Br.)—Entabeni, Aug.,

No. 4150a. **Pentanisia prunelloides** (Harv.) Druce—2 miles W. of Goede Hoop, 3000 ft., fls. blue, Aug., No. 4163; nr. Entabeni, Aug., No. 4234; **P. angustifolia** Hochst.—N. of Pepiti Falls, grassy places, Aug., No. 4367. **Anthospermum lanceolatum** Thunb.—Elsteg Farm (O.S. & V. 362); **A. aethiopicum** Linn.—nr. Entabeni, Aug., No. 4294.

BIGNONIACEAE.

Tecomaria capensis (Thunb.) Spach—Pepiti Falls, in patches of scrub, 3000 ft., up to 15 ft., fls. scarlet, Aug., No. 4350. **Rhigozum obovatum** Burch.—nr. Zoutpan (O.S. & V. 53); **R. zambesiaceum** Bak.—between Waterpoort and Wylie's Poort (O.S. & V. 340). **Catophractes Alexandri** Don—nr. Zoutpan, dominant (O.S. & V. 58; S. & V. 514).

VERBENACEAE.

Clerodendrum hirsutum Hochst.—nr. Entabeni, 4000 ft., fls. blue, Aug., No. 4242; **C. myricoides** R. Br.—nr. Zoutpan (O.S. & V. 602); **C. ternatum** Schinz—W. of Zoutpan (S. & V. 641); **C. simile** Pearson—Chapudi Farm, between Zoutpan and Waterpoort (O.S. & V. 252). **Lippia asperifolia** Rich. mtns. nr. Zoutpan (O.S. & V. 7, 128; S. & V. 519, 520).

HERBACEAE.

(Herbaceous Dicotyledons.)

RANUNCULACEAE.

Knowltonia transvaalensis Szyszyl.—Entabeni in open grass nr. the Forestry Station, 4500 ft., fls. white, tinged with red, Aug., No. 4336.

NYMPHAEACEAE.

Nymphaea capensis Thunb.—nr. Amisfort, in Davenhage's Pan (S. & V. 624).

MENISPERMACEAE.

Desmonema cafrum Miers—nr. Zoutpan (O.S. & V. 136). **Cocculus hirsutus** (Linn.) Diels—3 miles E. of Fogwell's Paradise, N. Zoutpansberg, in deciduous scrub, climber, fls. greenish-cream, Aug., No. 4456; nr. Zoutpan (O.S. & V. 284).

PIPERACEAE.

Peperomia retusa Dietr.—forest below Entabeni, epiphyte on tree-trunks nr. ground, Aug., No. 4253, 5 miles W. of Wylie's Poort, on shaded rocks, 4700 ft., Aug., No. 4385. **Piper capense** L.—below Entabeni, in forest, shrub 8 ft., Aug., No. 4270.

MOLLUGINACEAE.

Limeum Meyerli Fenzl—W. of Zoutpan (S. & V. 639); **L. Dinterli** Schell.—between Waterpoort and Zoutpan (S. & V. 264). **Semonvillea fenestrata** Fenzl—W. of Zoutpan (S. & V. 636). **Gisekia pharnaceoides** Linn.—nr. Vivo (S. & V. 545, 654). **Mollugo nudicaulis** Lam.—S.E. of Zoutpan (S. & V. 584); **M. Cerviana** (Linn.) Ser.—nr. margin of Zoutpan (S. & V. 532). **Pharnaceum salsoloides** Burch.—E. margin of Zoutpan (O.S. & V. 298; S. & V. 534). **Oryza decumbens** Forssk.—between Zoutpan and Waterpoort (O.S. & V. 269).

FICOIDACEAE.

Trianthema pentandra Linn.—margin of Zoutpan (S. & V. 546); **T. erectum** Schlechter—margin of Zoutpan (S. & V. 459). **Sesuvium digynum** Welw. ex Oliv.—nr. Zoutpan (B. & S. 232; S. & V. 488).

PORTULACACEAE.

Talinum Arnotii Hook f.—between Zoutpan and Waterpoort (O.S. & V. 260); **T. cafrum** (Thunb.) Eckl. & Zeyh.—N. of the Blaauwberg (O.S. & V. 93); **T. transvaalensis** von Poellnitz—nr. Zoutpan (O.S. & V. 193). **Portulacaria afra** Jacq.—Wylie's Poort (O.S. & V. 332). **Portulacca oleracea** Linn.—margin of Zoutpan (O.S. & V. 31); **P. quadrifida** Linn.—E. side of Zoutpan (O.S. & V. 294); **P. trianthemoides** Bremekamp—margin of Zoutpan (S. & V. 458).

POLYGONACEAE.

Polygonum lapathifolium var. **glabrum** B. Davy—nr. Amisfort (S. & V. 626); **P. serrulatum** Lag.—nr. Zoutpan (O.S. & V. 215).

AMARANTACEAE.

Pupalia lappacea Juss.—Wylie's Poort, June, No. 3215; nr. Zoutpan (O.S. & V. 238). **Celosia scabra** (Schinz) Schweickerdt—nr. Zoutpan (S. & V. 481). **Cyathula crispa** Schinz—N. of Zoutpan (O.S. & V. 46; S. & V. 505); **C. uncinulata** (Schrad.) Schinz.—margin of Zoutpan (S. & V. 496). **Alternanthera repens** (Linn.) O. Ktze.—E. of Zoutpan (S. & V. 548); **A. sessilis** (Linn.) R. Br.—nr. Zoutpan (O.S. & V. 207).

CHENOPODIACEAE.

Chenopodium ambrosioides Linn.—nr. Zoutpan (S. & V. 456). **Suaeda fruticosa** Forssk.—margin of Zoutpan (O.S. & V. 38; S. & V. 462).

NYCTAGINACEAE.

Commicarpus plumbagineus (Cav.) Standley—nr. margin of Zoutpan (O.S. & V. 19; S. & V. 451); **C. fallacissimus** (Heimerl) Heimerl, **forma pilosa** Heimerl—nr. Zoutpan and Vivo (O.S. & V. 103; S. & V. 653). **Boerhaavia diffusa** Linn.—E. of Zoutpan (S. & V. 551).

ONAGRACEAE.

Jussiaea angustifolia Lam.—nr. Zoutpan (S. & V. 559a).

GENTIANACEAE.

Sebaea erosa Schinz—Crewe Farm, 4700 ft., by stream, Aug., fls. yellow, No. 4438. **Limnanthemum Thunbergianum** Griseb.—nr. Entabeni, in stream, fls. submerged, Aug., No. 4316.

PRIMULACEAE.

Samolus Valerandi L.—Elsteg Farm (O.S. & V. 363).

CRASSULACEAE.

Crassula nodulosa Schönl.—below Entabeni, on rocks, fls. dingy, Aug., No. 4281; **C. argyrophylla** Diels—5 miles W. of Wylie's Poort, 4500 ft., on rocks, Aug., fls. white, leaves reddish, No. 4390; **C. acutifolia** Lam.—5 miles W. of Wylie's Poort, on rocks, 4800 ft., stems and leaves succulent, fls. yellow, Aug., No. 4402. **Kalanchoe paniculata** Harv.—nr. Zoutpan (S. & V. 561; O.S. & V. 184); **K. sexangularis** N.E. Br.—nr. Entabeni, Aug., No. 4332; **K. rotundifolia** Harv.—Crewe Farm, W. Zoutpansberg, 5000 ft., among shaded rocks, yellow, Aug., No. 4444; **K. Rogersii** R. Hamet—Wylie's Poort, N. entrance, 29 June, No. 3203. **Cotyledon orbiculata** Linn.—Crewe Farm, on builders, 4300 ft., Aug., fls. dull red, No. 4424.

SAXIFRAGACEAE.

Vahlia capensis Thunb.—nr. Zoutpan (O.S. & V. 232a).

DROSERACEAE.

Drosera trinervia Spreng—Pepiti Falls, rocks by falls, 3000 ft., Aug., No. 4352.

UMBELLIFERAE.

Hydrocotyle asiatica L.—nr. Zoutpan (O.S. & V. 225); **H. verticillata** Thunb.—nr. Zoutpan (O.S. & V. 200). **Steganotaenia araliacea** Hochst.—Wylie's Poort (O.S. & V. 331).

CAMPANULACEAE.

Wahlenbergia caledonica Sond.—9 miles S.E. of Louis Trichardt, herb, fls. pale blue or dull yellow, Aug., No. 4147; **W. paucidentata** Schinz—near Entabeni, fls. dirty white, Aug., No. 4232; **W. undulata** (Linn. f.) A. DC.—N. of Pepiti Falls, scrambling, fls. blue, Aug., No. 4361. **Cyphia elata** Harv.—N. of Pepiti Falls, in stony, grassy places, fls. dingy white, Aug., No. 4365.

LOBELIACEAE.

Lobelia decipiens Sond.—nr. Zoutpan (O.S. & V. 214); 2 miles W. of Goede Hoop, in marshy places, fls. blue, Aug., No. 4156; **L. natalensis** A. DC.—9 miles S.E. of Louis Trichardt, in grass, fls. pale blue or yellow, Aug., No. 4144.

COMPOSITAE.

Vernonia hirsuta Sch. Bip.—nr. Entabeni, fls. purple, Aug., No. 4235; **V. Moggii** Hutch.—nr. Entabeni, cleared borders of plantations, 4200 ft., fls. purple, Aug., No. 4231; **V. cinerascens** Sch. Bip.—between Zoutpan and Waterpoort (O.S. & V. 249); **V. podocoma** Sch. Bip.—2 miles E. of Goede Hoop, 3000 ft., shrub 5 ft., fls. pale blue, visited by butterflies, Aug., No. 4167; **V. triflora** Bremekamp—5 miles W. of Wylie's Poort, 5000 ft., in rocky places, shrub up to 5 ft., fls. white, Aug., No. 4394; **V. amygdalina** Del.—nr. Zoutpan (O.S. & V. 116); **V. fastigiata** Oliv. & Hiern—nr. Zoutpan (S. & V. 516); **V. transvaalensis** Hutch.—nr. Entabeni, climber, fls. mauve, Aug., No. 4225. **Mikania scandens** Linn.—Klein Australe, 3400 ft., in damp places, scandent, fls. white, Aug., No. 4176. **Eupatorium africanum** Oliv. & Hiern—below Entabeni, fls. white, Aug., No. 4257, Elsteg Farm (O.S. & V. 342a). **Ageratum conyzoides** Linn.—nr. Zoutpan (O.S. & V. 227). **Aster Harveyanus** O. Kuntze—nr. Entabeni, in stony, open places, fls. pale blue, Aug., No. 4325; **A. luteus** (N.E. Br.) Hutch.—between Zoutpan and Waterpoort (O.S. & V. 256); Vivo (S. & V. 656); **A. brevipedunculatus** Hutch.—Crewe Farm, among boulders, Aug., No. 4419; mtns. 5 miles W. of Wylie's Poort, Aug., No. 4383. **Epaltes alata** Steetz—9 miles S.E. of Louis Trichardt, 3000 ft., fls. purple, Aug., No. 4145; nr. Zoutpan (O.S. & V. 301; S. & V. 501). **Nidorella resedifolia** DC.—9 miles S.E. of Louis Trichardt, fls. yellow, Aug., No. 4153; nr. Zoutpan (S. & V. 495); between Zoutpan and Waterpoort (O.S. & V. 272). **Pegolettia senegalensis** Cass.—nr. Zoutpan (S. & V. 502). **Pleuchea Leubnitziae** (O. Hoffm.) N.E. Br.—nr. Zoutpan (O.S. & V. 55). **Psladia arabica** Jaub. & Spach—between Waterpoort and Wylie's Poort (O.S. & V. 334). **Blumea caffra** (DC.) O. Hoffm.—nr. Zoutpan (S. & V. 550); **B. lacera** DC.—Elsteg Farm, 6 miles W. of Louis Trichardt (O.S. & V. 205). **Brachylaena** sp.—N. of Pepiti, 3500 ft., among *Parinari*, shrub up to 15 ft., fls. white, paniculate, Aug., Nos. 4372, 4213; **B. huillensis** O. Hoffm.—Wylie's Poort, small tree, Dec., No. 2048. **Tarchonanthus Galpinii** Phillips & Hutch.—N. of Pepiti, upper limit of *Parinari* wood, shrub 12 ft., fls. white, Aug., No. 4375; N. entrance to Wylie's Poort, 29 June, No. 3222. **Geigeria aspera** Harv.—Pepiti Falls, 2900 ft., on grassy flats nr. the river, leggy shrub 3 ft., fls. yellow, Aug., No. 4341; Vivo (S. & V. 651); nr. Zoutpan (S. & V. 507); between Zoutpan and Waterpoort (O.S. & V. 273). **Athrixia phyllioides** DC.—Klein Australe, 3400 ft., in *Parinari* wood, Aug., rays mauve, disk yellow, No. 4183. **Metalasia muricata** Less.—Crewe Farm, W. Zoutpansberg, 5200 ft., S. face of mtn., up to 3 ft., fls. white, Aug., No. 4445. **Athanasia crithmifolia** Linn.—6 miles W. of Wylie's Poort, 5300 ft., in rocky places, 3 ft., fls. yellow, Aug., No. 4386. **Gnaphalium luteo-album** Linn.—2 miles W. of Goede Hoop, 3000 ft., fls. dull white, Aug., No. 4161; **G. undatum** Thunb.—nr. Entabeni, edge of forest, fls. white, Aug., No. 4299. **Helichrysum argyrosphaerum** DC.—9 miles S.E. of Louis Trichardt, 3000 ft., bracts pink and white, Aug., No. 4151; **H. leptolepis** DC.—same loc., No. 4154; **H. adenocarpum** DC.—nr. Entabeni, edge of forest, Aug., No. 4315; **H. decorum** DC.—nr. Entabeni, edge of forest, 4000 ft., fls. lemon-yellow, Aug., No. 4198; **H. fulgidum** Willd.—N. of Pepiti, 4000 ft., bracts yellow, Aug., No. 4202; Pepiti Falls, 3000 ft., grassy, places, No. 4354; **H. Cooperi** Harv.—edge of forest nr. Entabeni, bracts yellow, Aug., No. 4298; **H. lepidissimum** S. Moore—5 miles W. of Wylie's Poort, among rocks, 5200 ft., bracts yellow, Aug., No. 4387; **H. umbraculigerum** Less.—N. of Pepiti Falls, 4000 ft., heads very small, crowded into a flat compound head, yellow, Aug., No. 4201; **H. latifolium** Less.—nr. Entabeni, 4000 ft., fls. yellow, Aug., No. 4241; 2 miles W. of Goede Hoop, 3000 ft., marshy place lately burnt, yellow, Aug., No. 4162; **H. quinquenerve** Less.—mtn. pasture, 4000 ft., Aug., 3 ft., heads yellow,

No. 4193; *H. panduratum* O. Hoffm.—Klein Australe, 3400 ft., damp places, Aug., scandent, pale yellow, No. 4177; *H. eriphorum* Conr.—below Entabeni, Aug., yellow, No. 4243; *H. adscendens* Less.—4000 ft., Aug., pale yellow, No. 4195; *H. Kraussii* Sch. Bip.—Pepiti Falls, Aug., up to 3 ft., pale-yellow fls., common, No. 4349; Klein Australe, 3400 ft., in *Parinari-Pterocarpus* wood, Aug., 4 ft., fls. dull yellow, No. 4174; Elsteg Farm, 6 miles W. of Louis Trichardt (O.S. & V. 345); *H. caespitium* Sond.—5 miles W. of Wylie's Poort, grassy places, 4900 ft., Aug., white, No. 4391; *H. rugulosum* Less.—Klein Australe, 3400 ft., in *Parinari-Pterocarpus* wood, Aug., 3 ft., bracts dingy white, No. 4172. *Zoutpansbergia caerulea* Hutch. (see figure, p. 349)—Crewe Farm, N. slopes of mtns., Aug., No. 4435; Blaauwberg, Leeman 116. *Wedelia natalensis* Sond.—nr. Entabeni, Aug., yellow, No. 4239. *Schistostephium heptalobum* DC.—Klein Australe, 3400 ft., damp cleared places, Aug., 2 ft., yellow, No. 4180; *S. scandens* Hutch., n. sp.—edge of forest below Entabeni, Aug., scandent, fls. yellow, No. 4265 (type), 4263; *S. barbertonicus* Klatt 5 miles W. of Wylie's Poort, 5000 ft., rocky places, 3 ft. fleshy, yellow, No. 4404. *Gynura crepidioides* Benth.—nr. Entabeni, grassy places, Aug., fls. purple, No. 4313. *Cineraria deltoidea* Sond.—Entabeni, Aug., No. 4178. *Senecio latifolius* DC.—nr. Entabeni, 4000 ft., alpine pasture, Aug., herb 2 ft., yellow, No. 4196; *S. pterophorus* DC.—5 miles S.E. of Louis Trichardt, Aug., 4 ft., yellow, No. 4143; nr. Pepiti Falls, 2900 ft., Aug., woody, fls. yellow, No. 4340; *S. deltoideus* Less.—edge of forest below Entabeni, Aug., scandent, 12 ft., No. 4255; *S. coronatus* Harv.—near Louis Trichardt, fls. yellow, Dec., No. 2031; *S. polyanthemoides* Sch. Bip.—nr. Zoutpan (O.S. & V. 203); *S. longiflorus* Sch. Bip. (*Kleinia longiflora* DC.)—E. of Zoutpan (S. & V. 537). *Euryops tenuissimus* Less.—N. face of mtns., Crewe Farm, up to 3 ft., Aug., No. 4447. *Lopholaena coriifolia* (Sond.) Phill. & C.A. Smith—Crewe Farm, 4300 ft., crevices of sandstone rocks, shrub 2½ ft., fls. white, Aug., No. 4418; *L. disticha* (N.E. Br.) S. Moore—stony, grassy places N. of Pepiti Falls, 4500 ft., Aug., No. 4366. *Tripteris auriculata* S. Moore—nr. Entabeni, stony, open places, Aug., up to 3 ft., fls. yellow, No. 4318; N. of Pepiti, 4500 ft., Aug., up to 4 ft., fls. yellow, No. 4368; Crewe Farm, 4300 ft., Aug., shrub up to 5 ft., yellow, No. 4416. *Osteospermum grandiflorum* DC. mtn. tops nr. Louis Trichardt, low shrub, with coarsely dentate elliptic leaves, Dec., No. 2027. *Berkheya setifera* DC.—nr. Entabeni, grassy places, Aug., No. 4302; *B. subulata* Harv.—same loc., stony, open places, yellow, No. 4320. *Berkheyopsis bechuanensis* S. Moore—W. of Zoutpan (S. & V. 638). *Gazania pygmaea* Sond.—9 miles S.E. of Louis Trichardt, Aug., No. 4144. *Gerbera Jamesonii* Bolus—nr. Entabeni, stony, open places, Aug., ray-fls. scarlet, No. 4317; *G. piloselloides* Cass.—2 miles W. of Goede Hoop, 3000 ft., marshy place, lately burnt, Aug., white and crimson, No. 4160; *G. ambigua* Sch. Bip.—Entabeni, open ground, 4500 ft., Aug., rays white, No. 4338. *Crepis polyodon* Phillips—4000 ft., Aug., white or yellow, No. 4206a, 4205.

SOLANACEAE.

Solanum incanum L.—nr. Zoutpan (O.S. & V. 134); *S. panduriforme* E. Mey.—nr. Zoutpan (S. & V. 547); *S. kwebense* N.E. Br.—nr. Zoutpan (O.S. & V. 54, 57).

CONVOLVULACEAE.

Seddera suffruticosa (Schinz) Hall. f. var. *hirsutissima* Hall f.—nr. Zoutpan (O.S. & V. 177; S. & V. 509). *Ipomoea adenioides* Schinz—nr. Zoutpan (O.S. & V. 181); *I. Lugardii* var. *parviflora* Rendle—E. of Zoutpan (S. & V. 542). *Merremia pinnata* (Hochst.) Hall. f.—N. side of Zoutpan (S. & V. 568). *Hewittia bicolor* W. & A.—Klein Australe, 3400 ft., in damp places, July, No. 4175.

SCROPHULARIACEAE.

Halleria lucida L.—nr. Entabeni, 3600 ft., Aug., No. 4224. *Teedia lucida* Rud.—nr. Entabeni, edge of forest, shrub up to 8 ft., fls. mauve, Aug., No. 4310. *Zaluzianskya Katherinae* Hiern—mtn. 5 miles W. of Wylie's Poort, 4800 ft., on rocks, fls. white above, crimson below, Aug., No. 4381. *Aptosimum*

lineare Marl. & Engl.—between Zoutpan and Waterpoort (O.S. & V. 266); Vivo (S. & V. 655); **A. patulum** Bremekamp—E. of Zoutpan (S. & V. 565, 581). **Peliostomum leucorrhizum** E. Mey.—Eyem Farm, N. of Blaauwberg (O.S. & V. 94). **Diells reptans** Benth.—edge of forest below Entabeni, Aug., No. 4250. **Limosella maior** Diels—nr. Zoutpan (O.S. & V. 216); 13 miles W. of Wylie's Poort, 4200 ft., Aug., No. 4414. **Ilysanthes dubia** (L.) Bernh.—nr. Zoutpan (O.S. & V. 217). **Ramphicarpa tubulosa** (L.f.) Benth.—mnt. slopes nr. Zoutpan (O.S. & V. 233). **Striga gesnerioides** (Willd.) Vatke—nr. Zoutpan (O.S. & V. 127). **Buchnera brevibractealis** Hiern—Entabeni, herb in grassy places among stones, 4500 ft., fls. mauve, Aug., No. 4245. **Sutera aurantiaca** (Burch.) Hiern—9 miles S.E. of Louis Trichardt, 3000 ft., fls. yellow, Aug. No. 4148.

VALERIANACEAE.

Valeriana capensis Thunb.—between Klein Australe and Entabeni, in pasture by forest, 4000 ft., fls. pink, Aug., No. 4194.

DIPSACACEAE.

Scabiosa Columbaria Linn.—nr. Entabeni, fls. white, Aug., No. 4206.

SELAGINACEAE.

Selago natalensis Rolfe—edge of forest at Entabeni, Aug., No. 4295. **Hebentrestitia polystachya** Harv.—nr. Entabeni, 4000 ft., 1½ ft., fls. white, Aug., No. 4197.

LENTIBULARIACEAE.

Utricularia exoleta R. Br.—nr. Zoutpan (O.S. & V. 209).

GESNERIACEAE.

Streptocarpus luteus C. B. Clarke—nr. Entabeni, No. 2259.

PEDALIACEAE.

Sesamum capense Burm.—E. of Zoutpan (S. & V. 557). **Ceratotheca triloba** E. Mey.—nr. Zoutpan (S. & V. 583). **Pretraea zanguibarica** Gay—nr. Zoutpan (S. & V. 690). **Pterodiscus ngamicus** N.E. Br.—Zoutpan (O.S. & V. 427). **Harpagophytum Zeyheri** Decne—W. of Zoutpan (S. & V. 689). **Sesamothamnus Lugardii** N.E. Br.—nr. Zoutpan (O.S. & V. 59).

ACANTHACEAE.

Dyschoriste Fischeri Lindau—between Waterpoort and Wylie's Poort (O.S. & V. 333). **Ruellia patula** Jacq.—margin of Zoutpan (O.S. & V. 28) (S. & V. 467); between Zoutpan and Waterpoort (O.S. & V. 250). **Mackaya bella** Harv.—forest below Entabeni, in bud, shrub 10 ft., No. 4273. **Barleria Bremekampi** Obermeijer—nr. Blaauwberg (O.S. & V. 124); Crewe Farm, 4400 ft., up to 3 ft., fls. purple, among rocks, Aug., No. 4437; **B. elegans** S. Moore—foot of Blaauwberg (O.S. & V. 130); **B. Galpinii** C. B. Cl.—nr. Blaauwberg (O.S. & V. 123); **B. heterotricha** Lindau—nr. Blaauwberg (O.S. & V. 125); **B. obtusa** Nees—N. slopes of Blaauwberg (O.S. & V. 162); **B. transvaalensis** Obermeijer—N. of Zoutpan (O.S. & V. 50). **Neuracanthus africanus** T. Anders. ex S. Moore—between Zoutpan and Waterpoort (O.S. & V. 251). **Blepharis clarkel Schinz**—nr. Zoutpan (O.S. & V. 291); **B. diversispina** (Nees) C. B. Cl.—Zoutpan Farm (O.S. & V. 251a). **Phaylopsis parviflora** Willd.—Klein Australe, fls. white, fragrant, Aug., No. 4179. **Asystasia atriplicifolia** Bremekamp—Eyem Farm (O.S. & V. 89). **Ruspolia hypocrateriformis** var. **australis** Milne Redhead—Wylie's Poort (S. & V. 441). **Dielliptera elinopodia** Nees—Zoutpan (O.S. & V. 297); **D. nobilis** S. Moore—Klein Australe, nr. stream, straggly herb up to 4 ft., fls. magenta, Aug., No. 4189. **Justicia flava** Vahl—Zoutpan (O.S. & V. 21); **J. odora** Vahl—nr. Blaauwberg (O.S. & V. 190). **Crossandra Greenstockii** S. Moore—above Louis Trichardt, 16 Dec., fls. salmon, No. 1999.

ZYGOPHYLLACEAE.

Tribulus terrestris L.—E. of Zoutpan (S. & V. 539); **T. Zeyheri** Sond.—Vivo (S. & V. 650); between Zoutpan and Waterpoort (O.S. & V. 263); E. of Zoutpan (O.S. & V. 299). **Balanites australis** Bremekamp—W. of Zoutpan (S. & V. 479); nr. Zoutpan (O.S. & V. 15, 33); Waterpoort (Bremekamp & Schweickerdt 306).

GERANIACEAE.

Geranium ornithopodum Eckl. & Zeyh.—below Entabeni, edge of forest, climber, fls. white, Aug., No. 4289. **Pelargonium graveolens** Ait.—5 miles W. of Wylie's Poort, edge of evergreen scrub, 5000 ft., Aug., No. 4384; the most northerly record for this species, and undoubtedly wild in this locality; **P. transvaalense** Knuth—mnts. 5 miles W. of Wylie's Poort, 4500 ft., in evergreen scrub, scrambling, fls. pink, Aug., No. 4380. **Monsonia glauca** Knuth—W. of Zoutpan (S. & V. 640).

OXALIDACEAE.

Oxalis corniculata Linn.—2 miles W. of Goede Hoop, 3000 ft., marshy places lately burnt, Aug., No. 4159.

BALSAMINACEAE.

Impatiens sylvicola B. Davy & Greenway—below Entabeni, damp places in forest, Aug., No. 4251; Witvlag, on old dead trees, Dec., No. 2260.

BORAGINACEAE.

Heliotropium curassavicum L.—margin of Zoutpan (O.S. & V. 288; S. & V. 465); **H. lineare** C. H. Wright—between Zoutpan and Waterpoort (O.S. & V. 248); **H. Nelsonii** C. H. Wright—nr. Zoutpan (O.S. & V. 20; S. & V. 482, 510).

LABIATAE.

Micromeria biflora Benth.—Klein Australe, 3400 ft., bare hillside, fragrant herb, fls. white, Aug., No. 4171. **Salvia radula** Benth.—edge of forest, Entabeni, Aug., rocky places, sepals purple, No. 4297. **Leonotis dysophylla** Benth.—nr. Zoutpan (O.S. & V. 229). **Leucas glabrata** R. Br.—Elsteg Farm (O.S. & V. 364); **L. sexdentata** Skan—nr. Zoutpan (S. & V. 491). **Aeolanthus Rehmannii** Gürke—Wylie's Poort (S. & V. 670). **Endostemon tereticaulis** (Poir.) Ashby (*E. ocimoides* Bremekamp)—nr. Zoutpan (O.S. & V. 140). **Pycnostachys reticulata** Benth.—nr. Zoutpan (S. & V. 518). **Ocimum americanum** L.—nr. Zoutpan (S. & V. 494); **P. urticifolia** Hook.—Klein Australe, 3400 ft., damp places in wood, July, No. 4182. **Nautochilus labiatus** (N.E. Br.) Bremekamp—Wylie's Poort, N. entrance, Dec., No. 2085. **Becium obovatum** N.E. Br.—nr. Zoutpan (S. & V. 475). **Hemizygia canescens** (Gürke) Ashby—mnt. slopes nr. Zoutpan (S. & V. 613); **H. Obermeyeræ** Ashby—Witvlag, herb 2 ft., leaves woolly pubescent below, fls. pink, Dec., No. 2183. **Iboza riparia** N.E. Br.—Entabeni, in open rocky places, shrub, fls. pale mauve, Aug., No. 4319. **Plectranthus fruticosus** L'Herit.—forest below Entabeni, climber to 12 ft. long, fls. pale mauve-pink, Aug., No. 4252. **Stachys aethiopica** Linn.—5 miles W. of Wylie's Poort, 4500 ft., Aug., No. 4379.

MONOCOTYLEDONES.

HYDROCHARITACEAE.

Lagarosiphon muscoides Harv.—nr. Amisfort (S. & V. 627). **Ottelia ulvifolia** (Planch.) Walp. (*O. australis* Bremekamp)—nr. Amisfort (S. & V. 623); Vivo-vlei (Bremekamp & Schweickerdt 203).

APONOGETONACEAE.

Aponogeton Rehmannii Oliv.—Eyem Farm, N. of Blaauwberg (O.S. & V. 84); **A. gracilis** Schinz—plateau on N. slopes nr. Zoutpan (O.S. & V. 317a); **A. Holubii** Oliv.—nr. Amisfort (S. & V. 625).

COMMELINACEAE.

Commelina Forskalaei Vahl.—E. of Zoutpan (S. & V. 533).

XYRIDACEAE.

Xyris capensis Thunb.—nr. Zoutpan (O.S. & V. 198).

ERIOCAULACEAE.

Eriocaulon africanum Hochst.—Entabeni, by stream, heads white, Aug., No. 4324.

MUSACEAE.

Musa Davyae Stapf—nr. Entabeni, shaded rocks nr. stream, Aug., No. 4331.

LILIACEAE.

Anthericum elongatum Willd. var. **holostachyum** Baker—S. slopes 6 miles W. of Louis Trichardt (O.S. & V. 343); below Entabeni, fls. white with narrow crown stripe, Aug., No. 4249. **Aloe rubro-lutea** Schinz.—between Waterpoort and Zoutpan (S. & V. 451a); Stafford Farm, N. of Blaauwberg (S. & V. 647); **A. pluridens** Harv.—Crewe Farm, edge of evergreen scrub, up to 8 ft., Aug., No. 4451; **A. castanea** Schonl.—S. slopes 6 miles W. of Louis Trichardt (S. & N. 451a¹); Stafford Farm, N. of Blaauwberg (S. & V. 647); **A. Chabaudii** Schonl.—open rocky places near Entabeni, Aug., No. 4333; S. face of mtns. at Crewe Farm, fls. red with green stripe, leaves dark red, Aug., No. 4453. **Urginea Langii** Bremekamp—N. of Blaauwberg (O.S. & V. 80). **Dipcadi glaucum** (Burch.) Baker—nr. Zoutpan (O.S. & V. 29, 259). **Scilla megaphylla** Baker—Elsteg Farm (O.S. & V. 367); **S. natalensis** Planch.—below Entabeni, on rocks in grassy places, Aug., No. 4258; **S. collina** Hutch., n. sp.—Klein Australe, 3400 ft., on bare hillside, fls. mauve, Aug., No. 4186 (see p. 344). **Asparagus exuvialis** Burch.—nr. Zoutpan and N. of Blaauwberg (O.S. & V. 51, 97); **A. medeoloides** Thunb.—Klein Australe, 18 Aug., No. 4190; **A. falcatus** Linn.—nr. Entabeni, edge of forest, fruit red, Aug., No. 4303. **Albuca pachychlamys** Baker (*Urginea Langii* Bremek.)—Crewe Farm, in stony grassy places on N. side of mtns., 4600 ft., Aug., No. 4441; below Entabeni, fls. white with green stripe, Aug., No. 4247.

PHILESIACEAE.

Behnia reticulata Didrichs—nr. Entabeni, from Aug., No. 4227.

DIOSCOREACEAE.

Dioscorea cotinifolia Kunth—Elsteg Farm (O.S. & V. 360); top of mtns. above Wylie's Poort, No. 1987 (see p. 304); **D. Dregeana** var. **Hutchinsonii** Burkill—among boulders at top of mtns. above Louis Trichardt, No. 2002 (see p. 306).

AMARYLLIDACEAE.

Crinum buphanioides Baker—Eyem Farm, N. of Blaauwberg (O.S. & V. 86).

IRIDACEAE.

Dietes prolongata N.E. Br. var. **Galpinii** N.E. Br.—N. of Pepiti, 4400 ft., in forest, fls. white, Aug., No. 4371. **Morea stricta** Baker—below Entabeni, fls. pale, mottled with mauve, brown and yellow marks at base of the sepals, Aug., No. 4248.

HYPOXIDACEAE.

Hypoxis obtusa Burch.—nr. Entabeni, in rocky open places, fls. yellow, Aug., No. 4326; **H. angustifolia** Lam.—2 miles W. of Goede Hoop, 3000 ft., in marshy places lately burnt, fls. yellow, Aug., No. 4158.

¹ Listed by Schweickerdt & Verdoorn as *A. rubro-lutea* Schinz, a S.W. African species, but not the same.

VELLOZIACEAE.

Vellozia equisetoides Baker—N. slopes nr. Zoutpan (O.S. & V. 318).

ORCHIDACEAE.

Eulophia laxiflora Schltr.—2 miles W. of Goede Hoop, in marshy place, lately burnt, leafless, sepals dull red, petals yellow, Aug., No. 4165; **E. clittellifer** (Reichb. f.) Bolus—Entabeni, grassy, stony places, lip cream, veined with red, rest of flower dark dull red, Aug., No. 4256.

JUNCACEAE.

Juncus lomatophyllus Spreng.—nr. Zoutpan (O.S. & V. 208).

CYPERACEAE.

Cyperus sexangularis Nees—nr. Zoutpan (O.S. & V. 287). **Pycreus lanceus** (Thunb.) Turrill—nr. Zoutpan (O.S. & V. 196); **P. polystachyus** Beauv.—nr. Zoutpan (O.S. & V. 211). **Mariscus Dregeanus** Kunth—nr. Zoutpan (O.S. & V. 241). **Kyllinga melanosperma** Nees—nr. Zoutpan (O.S. & V. 197, 212). **Fuirena chlorocarpa** Ridley—nr. Zoutpan (O.S. & V. 210). **Scirpus muricinix** C.B. Cl.—N. of Blaauwberg (O.S. & V. 82). **Fimbristylis complanata** Link—nr. Zoutpan (O.S. & V. 199); **F. diphylla** Vahl—nr. Zoutpan (O.S. & V. 221). **Bullostylis collina** Kunth—nr. Entabeni, in open burnt places, Aug., No. 4323.

GRAMINEAE.

Hyparrhenia Ruprechtii (Hack.) Fourn.—foot of N. slopes of Blaauwberg (S. & V. 590). **Cymbopogon excavatus** (Hochst.) Stapf—foot of Blaauwberg (O.S. & V. 224); **C. validus** Stapf ex B. Davy—nr. Blaauwberg (S. & V. 587). **Bothriochloa pertusa** (Willd.) A. Camus—nr. Zoutpan (S. & V. 497). **Tragus Berteronianus** Schult.—margin of Zaltpan (S. & V. 452, 485); **T. arenarius** Bremek. & Oberm.—Zoutpan, Bremekamp & Schweickerdt 230a. **Paspalum scrobiculatum** Linn. var. **Commersonii** Stapf—nr. foot of Blaauwberg (O.S. & V. 223). **Panicum maximum** Jacq.—kloof above waterfall, Blaauwberg (S. & V. 598). **Urochloa rhodesiensis** Stent—Blaauwberg (S. & V. 483); **U. panicoides** Beauv.—Zoutpan (S. & V. 464). **Brachiaria deflexa** (Schum.) C. E. Hubbard ex Robyns—moist places nr. Blaauwberg (S. & V. 599); **B. glossa** Stapf—rocky slopes of Blaauwberg (S. & V. 525); **B. nigropedata** (Munro) Stapf—slopes of Blaauwberg (S. & V. 617). **Echinochloa colona** Link—N. slopes of Blaauwberg (S. & V. 618); **E. stagnina** (Retz.) Beauv.—nr. Blaauwberg (O.S. & V. 242). **Digitaria debilis** (Desf.) Willd.—nr. Blaauwberg (O.S. & V. 219); **D. eriantha** Steud.—nr. and on the Blaauwberg (S. & V. 670); **D. milaniana** Stapf—W. of Zoutpan (S. & V. 635). **Rhynchelytrum villosum** Chiov.—slopes of Blaauwberg and W. of Zoutpan (S. & V. 633). **Tricholaena monachne** (Trin.) Stapf & Hubbard—foot of Blaauwberg (S. & V. 589). **Cymbosetaria sagittifolia** (A. Rich.) Schweickerdt—Blaauwberg (S. & V. 578). **Setaria verticillata** (Linn.) Beauv.—margin of Zoutpan (S. & V. 466). **Cenchrus ciliaris** Linn.—nr. Blaauwberg (O.S. & V. 179; S. & V. 632). **Aristida adscensionis** Linn.—nr. Zoutpan (S. & V. 473); **A. meridionalis** Henr.—N. slopes of Blaauwberg (S. & V. 604); **A. junciformis** T. & R.—foot of Blaauwberg (S. & V. 572); **A. barbicollis** T. & R.—margin of Zoutpan (S. & V. 461); **A. uniplumis** Licht.—W. of Zoutpan (S. & V. 630). **Sporobolus panicoides** Rich.—Wylie's Poort (S. & V. 672); **S. pyramidalis** Beauv.—nr. Blaauwberg (S. & V. 500, 585); **S. Smutsii** Stent—nr. Zoutpan (S. & V. 460, 469). **Danthoniopsis Dinteri** (Pilger) C. E. Hubbard—Blaauwberg (S. & V. 522). **Loudetia filifolia** Schweickerdt—Blaauwberg (S. & V. 523). **Cynodon dactylon** (Linn.) Pers.—nr. Blaauwberg (O.S. & V. 228). **Chloris virgata** Sw.—nr. margin of Zoutpan (S. & V. 484); **C. myriostachya** Hochst.—Waterpoort, Bremekamp & Schweickerdt 291. **Dactyloctenium aegyptium** (Linn.) Beauv.—nr. Zoutpan (S. & V. 457). **Enneapogon cenchroides** (Licht.) Hubbard—nr. Blaauwberg and Zoutpan (S. & V. 478, 489, 538); **E. pretoriensis** Stent—rocky slopes of Blaauwberg (S. & V. 605). **Schmidtia**

bulbosa Stapf—Blaauwberg and nr. Zoutpan (S. & V. 569, 606, 631). **Phragmites communis** Trin.—E. of Zoutpan (S. & V. 621). **Trichoneura Schlechteri** Ekman—on and nr. Blaauwberg (S. & V. 526). **Odyssea paucinervis** (Nees) Stapf—dominant along margin of Zoutpan (S. & V. 453, 463, 498, 499). **Eragrostis cillianensis** Link—E. of Zoutpan (S. & V. 540); **E. aspera** (Jacq.) Nees—Wylie's Poort (S. & V. 449); **E. curvula** Nees—W. of Zoutpan (S. & V. 629); **E. chloromelas** Steud.—nr. Blaauwberg (S. & V. 586); **E. gummiflua** Nees—foot of Blaauwberg (S. & V. 573, 574); **E. ciliaris** Link—Lake Fundusi, Bremekamp & Schweickerdt 340. **Diplachne paucinervis** Stapf—Zoutpan, Bremekamp & Schweickerdt 230.

Chapter XXXIV

CHRONOLOGICAL SEQUENCE OF LOCALITIES IN THE UNION OF SOUTH AFRICA WHERE COLLECTIONS WERE MADE BY THE AUTHOR FROM AUGUST 1928 TO APRIL 1929

Nos. 1-3, Claremont, Cape Peninsula, 16 Aug., 1928. 4-6, Cape Flats, nr. Wynberg, Cape Peninsula, 16 Aug. 7-11, Cape Flats, nr. Plumstead, Cape Peninsula, 16 Aug. 12-45, mtn. slopes above Kirstenbosch, Cape Peninsula, 17 Aug. 46-49, nr. Orange Kloof, Cape Peninsula. 50-66, mtn. sides above Kirstenbosch, Cape Peninsula, 21 Aug. 67-96, mtns. between Fish Hoek and Simonstown, Cape Peninsula, 22 Aug. 97-98, mtn. tops, nr. Reservoir, Cape Peninsula, 21 Aug. 99, between Fish Hoek and Simonstown, Cape Peninsula, 22 Aug. 100-105, Hout Bay Nek, Cape Peninsula, 22 Aug. 106-123, Chapman's Peak Road, nr. Hout Bay, Cape Peninsula, 22 Aug. 124-138, Brandt Vlei, nr. Worcester, 26 Aug. 139, Claremont, Cape Peninsula. 140-147, Camps Bay, Cape Peninsula, 28 Aug. 148-151, mtns. between Fish Hoek and Simonstown, Cape Peninsula, 22 Aug. 152, Garden of Remembrance, Worcester, 25 Aug. 153-187, between Salt River and Kalabas Kraal (11-13 miles from Cape Town), 4 Sept. 188-198, between Kalabas Kraal and Malmesbury, 4 Sept. 199-210, between Malmesbury and Darling, 4 Sept. 211, nr. Darling, 5 Sept. 212-232, 2-3 miles north of Darling, 5 Sept. 233-237, slopes nr. Vredenburg, 5 Sept. 238-252, between Hopefield and Vredenburg, 5 Sept. 253, between Vredenburg and Hoetjes Bay, 5 Sept. 254, between Hopefield and Vredenburg, 5 Sept. 255, 3 miles north of Darling, 5 Sept. 256, between Darling and Hopefield, 5 Sept. 257-258, between Darling and Vredenburg, 5 Sept. 259-262, between Darling and Hopefield, 5 Sept. 263-269, Hoetjes Bay, 5 Sept. 270, between Hopefield and Vredenburg, 5 Sept. 271-272, above Hoetjes Bay, 5 Sept. 273-302, coast north of Saldanha Bay, 6 Sept. 303-304, between Vredenburg and Hopefield, 6 Sept. 305, between Darling and Hopefield, 6 Sept. 306-309, Muizenberg, 8 Sept. 310-335, Hottentots Holland, 9 Sept. 336-341, Sir Lowrys Pass, 10 Sept. 342-360, Hottentots Holland Mts., north of Sir Lowrys Pass, 10 Sept. 361-365, Tulbagh, 15 Sept. 366-383, west of Tulbagh, 15 Sept. 384-386, road to Tulbagh Waterfall, 16 Sept. 387-427, above Tulbagh Waterfall, 16 Sept. 428-443, Karoo Poort, 2 Sept. 444-448, Karoo, nr. Matjesfontein, 1 Sept. 449-451, Karoo Poort, 2 Sept. 452-453, nr. Matjesfontein, 31 Aug. 454-469, Paarl, 19 Sept. 470-472, nr. Tulbagh Waterfall, 16 Sept. 473-483, Hottentots Holland Mtns., 10 Sept. 484, nr. Tulbagh Waterfall, 16 Sept. 485-492, east of Bot River, 21 Sept. 493, Houw Hoek Pass, 21 Sept. 494-496, Sir Lowrys Pass (at top), 21 Sept. 497-498, Cape Flats, nr. Faure, 21 Sept. 499, hills east of Bot River, 21 Sept. 500, Sir Lowrys Pass, 21 Sept. 501, east of Bot River, 21 Sept. 502-503, Kopje east of Bot River. 504-505, top of Sir Lowrys Pass, 21 Sept. 506-514, above Caledon Baths Hotel, 22 Sept. 515-519, nr. Caledon, 22 Sept. 520-548, nr. coast south of Llandudno, Cape Peninsula, 26 Sept. 549-556, beyond Milnerton, nr. Table Bay, 28 Sept. 557-558, Cape Flats, 28 Sept. 559-562, south of Llandudno, 26 Sept. 563-618, gorge west of Ceres, 30 Sept. 619-632, Ceres Flower Show, 1 Oct. 633-635, nr. Ceres, 1 Oct. 636, Sir Lowrys Pass (Mrs. Solly's Farm), 3 Oct. 637-642, nr. Glencairn, Cape Peninsula, 4 Oct. 643-650, beyond Simonstown, 4 Oct. 651, Smitwinkel Bay, Cape Peninsula, 4 Oct. 652, nr. Vasco da Gama, Cape Peninsula, 4 Oct. 653-658, Smith's Farm, Buffels Bay, 4 Oct. 659, Vasco da Gama, 5 Oct. 660-664, between Smith's Farm and Vasco da Gama, 5 Oct. 665-668, nr. Vasco da Gama, 5 Oct. 669, nr. lighthouse at Sea Point, 5 Oct. 670, nr. Smitwinkel Bay, 5 Oct. 671-672, nr. Smith's Farm, 5 Oct. 673-702, between Matjesfontein and Sutherland, 9 Oct. 703-720, between Sutherland and Middlepost, 9 Oct. 721-733, nr. Elandsfontein, 10 Oct. 734-751, nr. Nieuwoudtville, 11 Oct. 752-757, 5 miles east of Nieuwoudtville, 11 Oct.

758-793, top of Vanrhyns Pass, 11 Oct. 794-798, Meulens Vlei, nr. Van Rhyns Pass, 11 Oct. 799-802, top of Vanrhyns Pass, 11 Oct. 803-811, nr. Bitterfontein, 13 Oct. 812-814 between Van Rhynsdorp and Nieuwverust, 12 Oct. 815-816, between Nieuwverust and Bitterfontein, 13 Oct. 817-838, between Garies and Khamieskroon, 13 Oct. 839-845, hills opposite Khamieskroon, 13 Oct. 846-888, Sneeuwkop, Khamiesberg, 14 Oct. 889-913, Klipfontein, 15 Oct. 914-915, between Ookiep and Steinkop, 15 Oct. 916-917, 10 miles west of Ookiep, 15 Oct. 918, drift nr. Steinkop, 15 Oct. 919-924, Klipfontein, 15 Oct. 925, Poort between Concordia and Pella, 16 Oct. 926, between Pofadder and Kakamas, 16 Oct. 927-928, between Pella and Pofadder, 16 Oct. 929, between Ookiep and Pella (41 miles), 16 Oct. 930-931, Pofadder, 17 Oct. 932-940, between Pofadder and Kakamas (4 miles), 17 Oct. 941, between Pofadder and Kakamas (16 miles), 17 Oct. 942, 1 mile east of Pofadder, 17 Oct. 943-944, nr. Kakamas, 17 Oct. 945-947, between Pofadder and Kakamas (24 miles), 17 Oct. 948, nr. Kakamas, 17 Oct. 949-956, south of Kenhardt, 18 Oct. 957, south of Brand Vlei, 18 Oct. 958-963, south of Kenhardt (37 miles), 18 Oct. 964-967, south of Fraserburg (47 miles), 18 Oct. 968-969, south of Kenhardt (23 miles), 18 Oct. 970-974, S.E. of Williston (22 miles), 18 Oct. 976, S.E. of Williston, 18 Oct. 977-980, between Williston and Merweville, 18 Oct. 981-987, 40 miles S.E. of Williston, 18 Oct. 988, 22 miles S.E. of Williston, 18 Oct. 989-991, Khamieskroon, 13 Oct. 992-993, nr. Ketting, 14 Oct. 994-998, slopes of Table Mtn. above Cape Town, nr. Mtn. Road, 26 Oct. 999, 36 miles south of Kenhardt, 18 Oct. 1000-1005, between Durbanville and Wellington, 27 Oct. 1006-1008, Bains Kloof, 27 Oct. 1009, top of Gydouw Pass, 27 Oct. 1010-1022, mtns. west of Gydouw Pass, 27 Oct. 1023, Schurfdieberg, 28 Oct. 1024, flats nr. Gydouw Pass, 28 Oct. 1025-1026, mtns. nr. top of Gydouw Pass, 28 Oct. 1027-1064, Cold Bokkeveld, 7 miles beyond Gydouw Pass, 28 Oct. 1065-1067, Bains Kloof, 29 Oct. 1068, nr. Paarl, 29 Oct. 1069, between Bain's Kloof and Wellington, 29 Oct. 1070, 8 miles beyond Gydouw Pass, 27 Oct. 1071, 20 miles from Pella, 16 Oct. 1072-1082, 9 miles beyond Grabouw at top of Viljoen's Pass. 1083-1087, 2 miles west of Robertson (Karoo), 30 Oct. 1088-1089, 4 miles east of Robertson, 31 Oct. 1090-1092, Cogmans Kloof, 31 Oct. 1093-1096, half-way between Montagu and Barrydale, 31 Oct. 1097-1101, Karoo nr. Barrydale, 31 Oct. 1102-1103, spitzkop of quartzite nr. Lemoenshoek, 1 Nov. 1104-1131, Waterkloof, Ladismith, 1 Nov. 1132-1133, nr. Warmbad, 1 Nov. 1134-1135, nr. Mrs. Foullard's Farm, 1 Nov. 1136-1137, nr. Warmbad, 1 Nov. 1138-1141, Seven Weeks Poort, 1 Nov. 1142-1146, between Calitzdorp and Cango, 2 Nov. 1147-1150, foot of Zwartberg Pass, southern side, 3 Nov. 1151-1174, kloof on Zwartberg Pass, southern side, 3 Nov. 1175, between Oudtshoorn and Montagu Pass, 4 Nov. 1176-1194, small stream at northern entrance to Montagu Pass, 4 Nov. 1195-1204, top of Montagu Pass, southern side, 4 Nov. 1205-1213, Montagu Pass, southern side, 4 Nov. 1214, foot of Montagu Pass, nr. George, 5 Nov. 1215-1231, nr. railway, Montagu Pass, 1500 ft. above George, 5 Nov. 1232-1243, Pachalsdorp, nr. George, 5 Nov. 1244-1249, 3 miles east of George, 5 Nov. 1250-1259, 4 miles east of George, 5 Nov. 1260-1267, 8 miles east of George, 5 Nov. 1268-1278, 10 miles east of George, 5 Nov. 1279-1285a, Touws River, 12 miles east of George, 5 Nov. 1286-1290, nr. Hoogekraal River, 23 miles east of George, open veld, 5 Nov. 1291-1297, 32 miles east of George, open veld, 5 Nov. 1298-1300, Hoogekraal, 34 miles east of George, open veld, 5 Nov. 1301-1302, 30 miles east of George, 5 Nov. 1303-1308, Phantom Pass, 37 miles east of George, 5 Nov. 1309-1310, nr. Knysna, 6 Nov. 1311-1321, Belvedere, opposite Knysna, 7 Nov. 1322-1328, 3 miles east of Knysna, open veld, 8 Nov. 1329-1330, 7 miles east of Knysna, in forest, 8 Nov. 1331-1340, 11 miles east of Knysna, open veld, 8 Nov. 1341-1344, 14 miles east of Knysna, 8 Nov. 1345-1350, Plettenberg's Bay, nr. the sea, 8 Nov. 1360-1363, nr. Bitou River, 8 Nov. 1364-1374, hills east of Keurbooms River, open scrub, 9 Nov. 1375-1380, 3 miles east of Keurbooms River, open veld on tops of hills, 9 Nov. 1381-1384, Kirby, nr. Forest Hall, 10 miles east of Keurbooms River, 9 Nov. 1385-1386a, Forest Hall Estate, towards the sea, 9 Nov. 1387, 12 miles east of Keurbooms River, 9 Nov. 1388-1390, 24 miles east of Keurbooms River in scrub (top of Groote River Hill), 9 Nov. 1391, Witte Els Bosch, 10 Nov. 1392-1411, mtn. slopes above Witte Els Bosch, 10 Nov. 1412-1418, 5 miles east of Witte Els Bosch; open veld in flats, 12 Nov. 1419-1424, Kareedouw Pass, half-way up, 12 Nov.

1425-1431, Kareedouw Pass, nr. the small waterfall, 12 Nov. **1432-1435**, top of Kareedouw Pass, 12 Nov. **1436-1438**, nr. Kareedouw Village, 12 Nov. **1439**, between Kareedouw and Humansdorp, 12 Nov. **1440-1445**, 2 miles west of Humansdorp, open small-bush veld, 12 Nov. **1446-1459**, nr. Jeffreys Bay, 13 Nov. **1460-1469**, 6 miles from Jeffrey's Bay, in flat nr. small stream, 13 Nov. **1470-1476**, kloof nr. Feriera Town, 14 Nov. **1477-1483**, top of Gamtoos River Pass, 14 Nov. **1484-1488**, beyond Gamtoos River Pass, open scrub, 14 Nov. **1489-1507**, foot of and lower slopes of mtns. beyond Gamtoos River Pass, 14 Nov. **1508**, 32 miles from Jeffreys Bay (towards Port Elizabeth) in flat fields, 14 Nov. **1509-1512**, between Port Elizabeth and Uitenhage (13 miles), in karoid scrub, 16 Nov. **1513-1521**, valley nr. Addo, 16 Nov. **1522-1552**, Howieson's Poort, nr. Grahamstown, 17 Nov. **1553-1568**, nr. Bathurst, in small savannah, 18 Nov. **1569**, Blauwkrantz River, nr. Grahamstown, 19 Nov. **1570-1576**, Fish River Valley, 19 miles from Grahamstown, King Williamstown Road, 19 Nov. **1577-1582**, Pluto's Vale, nr. Grahamstown, 19 Nov. **1583-1585**, Bothas Hill, nr. Grahamstown, 19 Nov. **1586**, Flats between Grahamstown and Bothas Hill, 19 Nov. **1587-1601**, Ayleshy Farm, nr. Grahamstown, 20 Nov. **1602-1605**, nr. Botha's Hill, 20 Nov. **1606-1608**, hills above Balfour, 3000 ft., 26 Nov. **1609**, between Grahamstown and Fort Beaufort, Fish River Scrub, 26 Nov. **1610-1660**, top of Katberg, 27 Nov. **1661-1673**, Katberg Pass, 4500 ft., 27 Nov. **1674-1684**, Black Bridge, Katberg Pass, 27 Nov. **1685-1687**, below Black Bridge, Katberg Pass, 27 Nov. **1688-1693**, between Seymour and Alice, in wood, 28 Nov. **1694-1702**, 8 miles from King Williamstown towards East London, 28 Nov. **1703-1713**, 14 miles N.E. of East London, ungrazed grass veld, 29 Nov. **1714-1715**, nr. Mooiplaats, 29 Nov. **1716-1721**, between Mooiplaats and Komgha, 29 Nov. **1722-1732**, nr. Libode, in grass, 1 Dec. **1733-1741**, mtn. forest approaching Port St. Johns, 1 Dec. **1742-1769**, coastal belt, Port St. Johns, 2 Dec. **1770**, south side of Port St. Johns River, 3 Dec. **1771-1783**, between Port St. Johns and Lusikisiki, 3 Dec. **1784**, nr. Lusikisiki, 3 Dec. **1785-1788**, nr. Flagstaff, 3 Dec. **1789-1811**, between Flagstaff and Kokstad, 4 Dec. **1812-1826**, beyond Kokstad, nr. Mt. Currie, 5 Dec. **1827-1828**, nr. Port St. Johns, 4 Dec. **1829-1838**, between Kokstad and Richmond, 5 Dec. **1839**, on trees in Maritzburg Bot. Garden, 6 Dec. **1840-1848**, Umgeni, Natal, 6 Dec. **1849-1853**, nr. Howick, Natal, 10 Dec. **1854-1859**, nr. Mooi River, 10 Dec. **1860-1862**, nr. Colenso, Natal, 11 Dec. **1863-1867**, nr. Howick, Natal, 10 Dec. **1868-1873**, nr. Ladysmith, Natal, 11 Dec. **1874-1903**, beyond Warmbaths, Waterberg, Transvaal, 14 Dec. **1904-1910**, Waterberg Hills, Transvaal, 14 Dec. **1911-1940**, nr. Potgietersrust, 15 Dec. **1941-1967**, 2 miles north of Potgietersrust, 15 Dec. **1968-1986**, rise between Potgietersrust and Pietersburg, 15 Dec. **1987-2036**, Zoutpansberg, nr. Louis Trichardt (road to Wylie's Poort), 16 Dec. **2037-2055**, Wylie's Poort, northern slopes, 17 Dec. **2056-2097**, Wylie's Poort, nr. stream at north end, 17 Dec. **2098-2130**, Limpopo River, nr. Main Drift, Messina, 18 Dec. **2131-2133**, nr. Dongola, 19 Dec. **2134-2147**, Dongola, 19 Dec. **2148-2167**, between Thomson's Store and Lake Fundusi, Zoutpansberg, 21 Dec. **2168-2183**, Witvlag, 21 Dec. **2184-2207**, towards Lake Fundusi, Transvaal, 21 Dec. **2208-2248**, Woodbush, Transvaal, 23 Dec. **2249-2261**, Witvlag, 21 Dec. **2262-2281**, Woodbush, Transvaal, 23 Dec. **2282-2284**, Moorddrift, nr. children's grave, 24 Dec. **2285-2288**, 6-8 miles east of Pietersburg, 23 Dec. **2289-2294**, south of Waterberg Mtns., 24 Dec. **2295-2300**, between Thomson's Store and Lake Fundusi, Zoutpansberg, 21 Dec. **2301-2311**, kopje nr. Dongola, 19 Dec. **2312-2315**, kopje at Fountains Valley, 28 Dec. **2326-2350**, Hartbeestpoort, Magaliesberg, 31 Dec. **2351-2401**, Doornkloof, Irene, 1-2 Jan., 1929. **2402-2403**, Hartbeestpoort, Magaliesberg, 31 Dec., 1928. **2404-2408**, Doornkloof, Irene, Transvaal, 2 Jan., 1929. **2409**, Komati Poort, nr. hotel, 9 Jan. **2410-2416**, between Louws Creek and Maid of the Mist Mtn. (towards top of first ascent), 5 Jan. **2417-2433**, mtn. tops between Louws Creek and Maid of the Mist Mtn., 5 Jan. **2434**, nr. camp towards Maid of the Mist Mtn., 5 Jan. **2435-2437**, mtn. tops between Louws Creek and Maid of the Mist Mtn., 5 Jan. **2438-2448**, camp nr. Maid of the Mist Mtn., 6 Jan. **2449-2468**, Maid of the Mist Mtn., 6 Jan. **2469**, nr. Louws Creek, 6 Jan. **2470-2476**, at 8 miles from Barberton to Louws Creek, 7 Jan. **2477-2478**, at 10 miles from Barberton to Louws Creek, 7 Jan. **2479-2481**, at 12 miles from Barberton to Louws Creek, 7 Jan. **2482-2489**, at 23 miles from Barberton to Louws Creek, 7 Jan. **2490-2495**, nr. Impala Siding, between Barberton and Komati Poort, 8 Jan. **2496**, between Louws Creek and Tonetti. **2497-2508**,

road to Lomati Falls from Barberton, 7 Jan. 2509-2516, nr. Louws Creek, 7 Jan. 2517-2518, between Melalane and Hector's Spruit, 8 Jan. 2519-2520, between Hector's Spruit and Hora Forest (11 miles), 8 Jan. 2521-2522, between Hector's Spruit and Hora Forest (23 miles), 8 Jan. 2523-2528, between Hector's Spruit and Hora Forest (26 miles), 8 Jan. 2529, between Hector's Spruit and Hora Forest (27 miles), 8 Jan. 2530-2532, between Hector's Spruit and Hora Forest (28 miles), 8 Jan. 2533, between Hector's Spruit and Hora Forest (31 miles), 8 Jan. 2534-2535, nr. Hector's Spruit, 9 Jan. 2536, between Hector's Spruit and Komati Poort (1½ miles), 9 Jan. 2537-2540, between Hector's Spruit and Komati Poort (3 miles), 9 Jan. 2541-2542, between Hector's Spruit and Komati Poort (8 miles), 9 Jan. 2543-2544, between Hector's Spruit and Komati Poort (10 miles), 9 Jan. 2545-2553, Lebombo Mtns., western slopes, Portuguese E. Africa, 9 Jan. 2554-2601, Horns Nek, Magaliesberg, 15 Jan. 2602, Doornkloof, Irene, 17 Jan. 2603-2616, between Irene and Johannesburg, open grass veld, 17 Jan. 2617-2627, nr. Kempton Park, in long grass nr. swamp, 17 Jan. 2628, between Potgietersrust and Swerwerskraal (21 miles), 22 Jan. 2629-2638, Swerwerskraal, 34 miles N.W. of Potgietersrust, 22 Jan. 2639-2643, Matala Hills, nr. Swerwerskraal, 22 Jan. 2644-2648, Helbron Farm, nr. Swerwerskraal, 22 Jan. 2649-2652, 28 miles N.W. of Swerwerskraal, 23 Jan. 2653-2654, 44 miles N.W. of Swerwerskraal, 23 Jan. 2655-2656, Saltmere, 23 Jan. 2657-2658, nr. Magalakwin River Bridge, 23 Jan. 2659-2661, nr. Magalakwin River Drift, 23 Jan. 2662-2675, nr. Wagon Drift, east side of river, 23 Jan. 2676, 4 miles east of Wagon Drift, 23 Jan. 2677, 6 miles east of Wagon Drift, 23 Jan. 2678-2679, 7 miles east of Wagon Drift, 23 Jan. 2680-2692, nr. Camp, north of Blaauwberg, 24 Jan. 2693-2696, nr. Premier Mine, Pretoria, grass veld, with scattered *Acacia*, 29 Jan. 2697-2709, between Premier Mine and Erasmus, 29 Jan. 2710-2714, 3 miles west of Middleburg, Transvaal, 30 Jan. 2715-2718, 5 miles west of Middleburg, Transvaal, 30 Jan. 2719, nr. Arnot, by side of railway, 30 Jan. 2700-2729, between Arnot and Belfast, in open grass land, 30 Jan. 2730-2768, Belfast, Eastern Transvaal, on the common. 2769-2807, Belfast, rocky hillocks nr. the dam and in Vleis, Feb. 1. 2808-2811, nr. Machadadorp, Feb. 2. 2812-2833, Suikerboskop Farm, nr. Belfast (Mr. Maskew's Farm), 3 Feb. 2834-2916, between Pretoria and Pienaars River, 26 Jan. 2917-2939, Magatas Nek, nr. Rustenburg, 6 Feb. 2940-2942, between Rustenburg and Zeerust, 7 Feb. 2943-2949, junction of Zeerust and Rieckertsdam roads, 8 Feb. 2950-2958, hills north of Zeerust, 8 Feb. 2959, west of Zeerust, 8 Feb. 2960-2963, between Zeerust and Mafeking, 8 Feb. 2964-2967, nr. Mafeking (15 miles west), 9 Feb. 2968-2969, between Setagoli and Vryburg, 9 Feb. 2970-2971, between Vryburg and Schweitzer Reinecke, 10 Feb. 2972-2975, between Wolmaransstad and Klerksdorp, 11 Feb. 2976-2977, between Mafeking and Vryburg (50 miles from Mafeking), 9 Feb. 2978-2986, nr. Parys, Orange Free State, 15 Feb. 2987-2989, nr. Commando Drift, 16 Feb. 2990, Christiana, Orange Free State, 17 Feb. 2991, between Christiana and Warrenton, left bank of Vaal River, 18 Feb. 2992, between Kimberley and Riverton, 20 Feb. 2993-3000, kopjes nr. Kimberley, 19 Feb. 3001-3004, Baviaans Krantz, nr. Kaap Plateau, 21 Feb. 3005-3008, nr. Papkuil, 21 Feb. 3009-3014, hills between Papkuil and Postmasburg, 22 Feb. 3015-3021, hills parallel to and east of Asbestos Mtns., 23 Feb. 3022-3023, Blinklip Cave, nr. Postmasburg, 23 Feb. 3024-3038, Postmasburg, 23 Feb. 3039-3040, between Postmasburg and Griquatown, 23 Feb. 3041-3053, Wittwater, 23 Feb. 3054, nr. Campbell, 24 Feb. 3055, between Kaffir River and Edenburg, Orange Free State, 28 Feb. 3056-3068, Fauresmith Reserve, 1 March. 3069-3070, nr. Colesberg, 3 March. 3071-3097, Kivorsch Mtns., nr. Naauwpoort, Orange Free State, 4 March. 3098-3106, towards Tafel Berg from Middelburg, Cape Province, 6 March. 3107-3109, top of Tafel Berg, nr. Middleburg, Cape Province, 6 March. 3110-3113, Tafelberg Hill Farm, 6 March. 3114-3117, south of Middelburg, 8 March. 3118-3126, Roode Hoogte Pass, 8 March. 3127-3129, west of Middelburg, 7 March. 3130-3132, nr. Naude's Pass, 8 March. 3133-3137, towards Groote River from Aberdeen, 9 March. 3138-3144, nr. Colesberg, 3 March. 3145-3148, Meirings Poort, 10 March. 3149-3155, Robinson Pass, 24 March. 3156, nr. Albertinia, 24 March. 3157, River Zondereinde, 25 March. 3158-3162, between Caledon and Hermanns, 26 March. 3163-3164, Hermanns, 27 March. 3165-3175, nr. George, 13 March. 3176-3180, Mossel Bay, 15 March. 3181-3186, Table Mtn., 5 April. 3187-3194, Cecilia Gorge, Table Mtn., 5 April. 3195-3200, Zekoe Vlei, 9 April.

Chapter XXXV

CHRONOLOGICAL SEQUENCE OF LOCALITIES FOR SPECIMENS COLLECTED ON GENERAL SMUTS' BOTANICAL EXPEDITION FROM PRETORIA, THROUGH RHODESIA, TO LAKE TANGANYIKA, ETC., JUNE-SEPTEMBER, 1930

No. **3201**, Louis Trichardt Hill, Zoutpansberg, N. Transvaal, 29 June. **3202-3233**, Wylie's Poort, Zoutpansberg, N. Transvaal, 29 June. **3234-3245**, 10 miles S. of Messina, N. Transvaal, 29 June. **3246**, Wylie's Poort, 29 June. **3247-3313**, Lundi River, S. Rhodesia, 30 June. **3314-3352**, in and around Zimbabwe Ruins, S. Rhodesia, 1 July. **3353-3393**, a few miles E. of Zimbabwe, S. Rhodesia, 2 July. **3393a**, Zimbabwe, S. Rhodesia, 2 July. **3394-3395**, 9 miles N.W. of Umvuma, S. Rhodesia, 3 July. **3396-3401**, 13 miles E. of Gwelo, S. Rhodesia, 3 July. **3402-3406**, Shangani River, S. Rhodesia, 3 July. **3407-3408**, 25 miles N.W. of Bulawayo, 3 July. **3409**, 81 miles from Bulawayo to Victoria Falls, 4 July. **3410**, nr. Dett, S. Rhodesia, 4 July. **3411-3424**, Zambesi, 1 mile above falls, N. bank, 6 July. **3425-3433**, Victoria Falls, 7 July. **3434-3469**, Rian Forest, Victoria Falls, 7 July. **3470-3490**, Brachystegia Forest, S. of falls, along Bulawayo Road, S. Rhodesia, 8 July. **3491-3494**, Combretum-Mopane Veld, nr. Victoria Falls, S. Rhodesia, 8 July. **3495-3496**, 34 miles N.E. of Livingstone, N. Rhodesia, 10 July. **3497-3500**, 46 miles N.E. of Livingstone, N. Rhodesia, 10 July. **3501-3502**, 49 miles N.E. of Livingstone, N. Rhodesia, 10 July. **3503**, 34 miles N.E. of Livingstone, N. Rhodesia, 10 July. **3504-3506**, 25 miles N.E. of Livingstone, N. Rhodesia, 10 July. **3507**, Victoria Falls, 7 July. **3508-3511**, Zimba, N. Rhodesia, 10 July. **3512-3523**, 64 miles N.E. of Livingstone, N. Rhodesia, 10 July. **3524-3526**, 81 miles N.E. of Livingstone, N. Rhodesia, 10 July. **3527-3528**, 89 miles N.E. of Livingstone, N. Rhodesia, 10 July. **3529**, Choma, 10 July. **3530-3531**, 17 miles N.E. of Choma, N. Rhodesia, 11 July. **3532**, Choma, N. Rhodesia, 11 July. **3533**, 17 miles N.E. of Choma, N. Rhodesia, 11 July. **3534**, nr. Choma, N. Rhodesia, 11 July. **3535**, 17 miles N.E. of Choma, N. Rhodesia, 11 July. **3536**, 64 miles N.E. of Livingstone, N. Rhodesia, 11 July. **3537-3543**, 17 miles N.E. of Choma, N. Rhodesia, 11 July. **3544-3545**, 23 miles N.E. of Choma, N. Rhodesia, 11 July. **3546**, 20 miles N.E. of Choma, N. Rhodesia, 11 July. **3547-3551**, 23 miles N.E. of Choma, N. Rhodesia, 11 July. **3552-3564**, nr. Monze, N. Rhodesia, 12 July. **3565-3566**, 21 miles N.E. of Mazabuka, N. Rhodesia, 12 July. **3567-3571**, Vlei, 30 miles N.E. of Mazabuka, N. Rhodesia, 12 July. **3572-3573**, 7 miles W. of Kafué River, N. Rhodesia, 12 July. **3574-3586**, Kafué River, N. Rhodesia, 12 July. **3587**, 2 miles N.E. of Kafué River, N. Rhodesia, 12 July. **3588-3591**, 18 miles N.E. of Kafué River, N. Rhodesia, 12 July. **3592**, 2½ miles W. of Lusaka, N. Rhodesia, 12 July. **3593-3595**, 7½ miles E. of Lusaka, N. Rhodesia, 12 July. **3596**, Kafué River, 12 July. **3597-3601**, 10 miles N.E. of Lusaka, 13 July. **3602**, 23 miles N.E. of Lusaka, 13 July. **3603-3613**, 28 miles S.W. of Broken Hill, 13 July. **3614**, 60 miles S.W. of Broken Hill, 13 July. **3615-3632**, 28 miles S.W. of Broken Hill, 13 July. **3633-3634**, 22 miles S.W. of Broken Hill, 13 July. **3635**, 28 miles S.W. of Broken Hill. **3636-3649**, 5 miles S.W. of Broken Hill, 13 July. **3650**, Lundi River, 30 June. **3651**, 34 miles N.E. of Broken Hill, 14 July. **3652**, Bwana Mkuba, 14 July. **3653**, 30 miles E. of Kapiri Mposhi, 14 July. **3654-3692**, 5 miles N.E. of Chiwefwe, N. Rhodesia, 14 July. **3693-3698**, Chiwefwe River, N. Rhodesia, 15 July. **3699-3700**, river 17 miles N.E. of Chiwefwe, 15 July. **3701-3705**, 20 miles S.W. of Serenje Corner, N. Rhodesia, 15 July. **3706-3715**, Serenje Corner, 5200 ft., N. Rhodesia, 16 July. **3716-3720**, 22 miles N.E. of Serenje Corner, 16 July. **3721-3745**, Lukulu River, N. Rhodesia, 16 July. **3746-3749**, Kaloswe, N. Rhodesia, 16 July. **3750-3754**, 66 miles N.E. of Serenje Corner, N. Rhodesia, 16 July. **3755-3775**, Kaloswe, N. Rhodesia, 16 July. **3776**, 10 miles S.W. of Mpika, N. Rhodesia,

16 July. **3777-3781**, 6-10 miles S.W. of Mpika, 16 July. **3782**, Kaloswe, 16 July. **3783-3785**, Mpika, N. Rhodesia, 17 July. **3786-3787**, 53 miles N. of Mpika, N. Rhodesia, 17 July. **3788**, 65 miles N. of Mpika, N. Rhodesia, 17 July. **3789-3797**, Chambesi River, N. Rhodesia, 17 July. **3798**, 1 mile N. of Chambesi River, 17 July. **3799**, 15 miles N. of Chambesi River, 17 July. **3800**, 30 miles N. of Chambesi River, 17 July. **3801**, 6 miles N.E. of Kasama, 17 July. **3802-3804**, 11 miles N.E. of Kasama, 17 July. **3805-3815**, 30 miles N. of Kasama, 18 July. **3816-3822**, 43 miles N. of Kasama, 18 July. **3823-3825**, 51 miles S. of Abercorn, 18 July. **3826-3851**, 44 miles S. of Abercorn, 18 July. **3852-3856**, 30 miles S. of Abercorn, 18 July. **3857-3868**, 27 miles S. of Abercorn, 18 July. **3869**, 5 miles S. of Abercorn, 18 July. **3870-3881**, small lake near Abercorn, 18 July. **3882-3907**, kopje near lake at Abercorn, 19 July. **3908-3918**, between Abercorn (7 miles) and Lake Tanganyika, 19 July. **3919-3939**, 12 miles N.W. of Abercorn, 19 July. **3940-3941**, Tom's Village, Lake Tanganyika, 20 July. **3942**, 15 miles N.W. of Abercorn, 20 July. **3943-3946**, 17 miles N.W. of Abercorn, 3100 ft., 20 July. **3947**, 18 miles N.W. of Abercorn, 3100 ft., 20 July. **3948-3957**, Mpulungu, 2600 ft., 20 July. **3958**, 2 miles S. of Mpulungu, 2700 ft., 20 July. **3959-3960**, 4 miles S. of Mpulungu, 3000 ft., 20 July. **3961**, 7½ miles S. of Mpulungu, 3200 ft., 20 July. **3962-3963**, 8 miles S. of Mpulungu, 3400 ft., 20 July. **3964-3978**, nr. Lunzua River, N.W. of Abercorn, 3400 ft., 20 July. **3979**, crest of escarpment S.W. of Lake Tanganyika, nr. Lunzua River, 5600 ft., 21 July. **3980-3988**, escarpment (as above) 4000 ft., 21 July. **3989-3991**, nr. Lunzua River, 3100 ft., 21 July. **3992**, escarpment (as above), 21 July. **3993-3994**, nr. Lunzua River, 21 July. **3994a-3996**, 11 miles S. of Lake Tanganyika, 3900 ft., 22 July. **3997-4011**, 8 miles N.W. of Abercorn, 4400 ft., 22 July. **4012-4016**, 2 miles N.W. of Abercorn, 5300 ft., 22 July. **4017-4018**, 7 miles S. of Abercorn, 5400 ft., 22 July. **4019-4021**, 9 miles S. of Abercorn, 5400 ft., 22 July. **4022-4029**, 25 miles S. of Abercorn, 4800 ft., 22 July. **4030**, 35 miles S. of Abercorn, 4800 ft., 22 July. **4031-4055**, 6 miles N. of Kasama, 4100 ft., 23 July. **4056-4059**, 59 miles S. of Kasama, 3800 ft., 23 July. **4060**, 52 miles N. of Mpika, 4000 ft., 24 July. **4061-4062**, 30 miles S.E. of Mpika, 4300 ft., 24 July. **4063-4074**, Koloswe (39 miles S.E. of Mpika), 4000 ft., 24 July. **4075-4083**, 32 miles N.E. of Serenje Corner, 5200 ft., 25 July. **4084**, 32 miles S.W. of Serenje Corner, 4700 ft., 25 July. **4085**, 42 miles S.W. of Serenje Corner, 4500 ft., 25 July. **4089**, 12 miles N.E. of Chiwefwe, 4400 ft., 25 July. **4090-4092**, 4 miles W. of Chiwefwe, 4200 ft., 25 July. **4093-4108**, Sakania, Belgian Congo, 30 July. **4109-4129**, nr. Elizabethville, Belgian Congo, 2 Aug. **4130-4142**, Matopos, S. Rhodesia, 8 Aug. **4143**, 5 miles S.E. of Louis Trichardt, N. Transvaal, 18 Aug. **4144-4155**, 9 miles S.E. of Louis Trichardt, grassy places, 18 Aug. **4156-4165**, 2 miles W. of Goede Hoop, N. Transvaal, 18 Aug. **4166-4167**, 2 miles E. of Goede Hoop, 18 Aug. **4168-4190**, Klein Australe, Zoutpansberg, 3400 ft., 18-19 Aug. **4191-4195**, between Klein Australe and Entabeni, Zoutpansberg, 19 Aug. **4196-4338**, nr. Entabeni, Zoutpansberg, 19-20 Aug. **4339**, Palmmary Ville, Zoutpansberg, 2500 ft., 20 Aug. **4340-4360**, nr. Pepiti Falls, Zoutpansberg, 2900 ft., 20 Aug. **4361-4375**, N. of Pepiti Falls, Zoutpansberg, 3800 ft., 21 Aug. **4376-4377**, foothills S. of Pepiti Falls, E. Zoutpansberg, 21 Aug. **4378**, nr. Palmmary Ville, E. Zoutpansberg, 22 Aug. **4379-4413**, mtns. 5 miles W. of Wylie's Poort, W. Zoutpansberg, 22 Aug., 4500 ft. **4414**, 13 miles W. of Wylie's Poort, 4200 ft., 23 Aug. **4415-4441**, Crewe Farm, W. Zoutpansberg, 4200-4300 ft., 23 Aug. **4442**, main road south of Klein Australe, E. Zoutpansberg, 22 Aug. **4443-4454**, Crewe Farm, W. Zoutpansberg, 5200 ft., 23 Aug. **4455**, 1 mile W. of Wylie's Poort, Zoutpansberg, 4400 ft., 23 Aug. **4456-4458**, 3 miles E. of Fogwell's Paradise, N. Zoutpansberg, 2800 ft., 23 Aug. **4459**, 6 miles E. of Fogwell's Paradise, N. Zoutpansberg, 2700 ft., 23 Aug. **4460-4479**, Matoks, on granite kopje, 3300 ft., 24 Aug. **4480-4648**, National Park, Natal, 28 Aug.-2 Sept. **4649-4731**, Bothas Hill, Natal, 3 Sept.

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